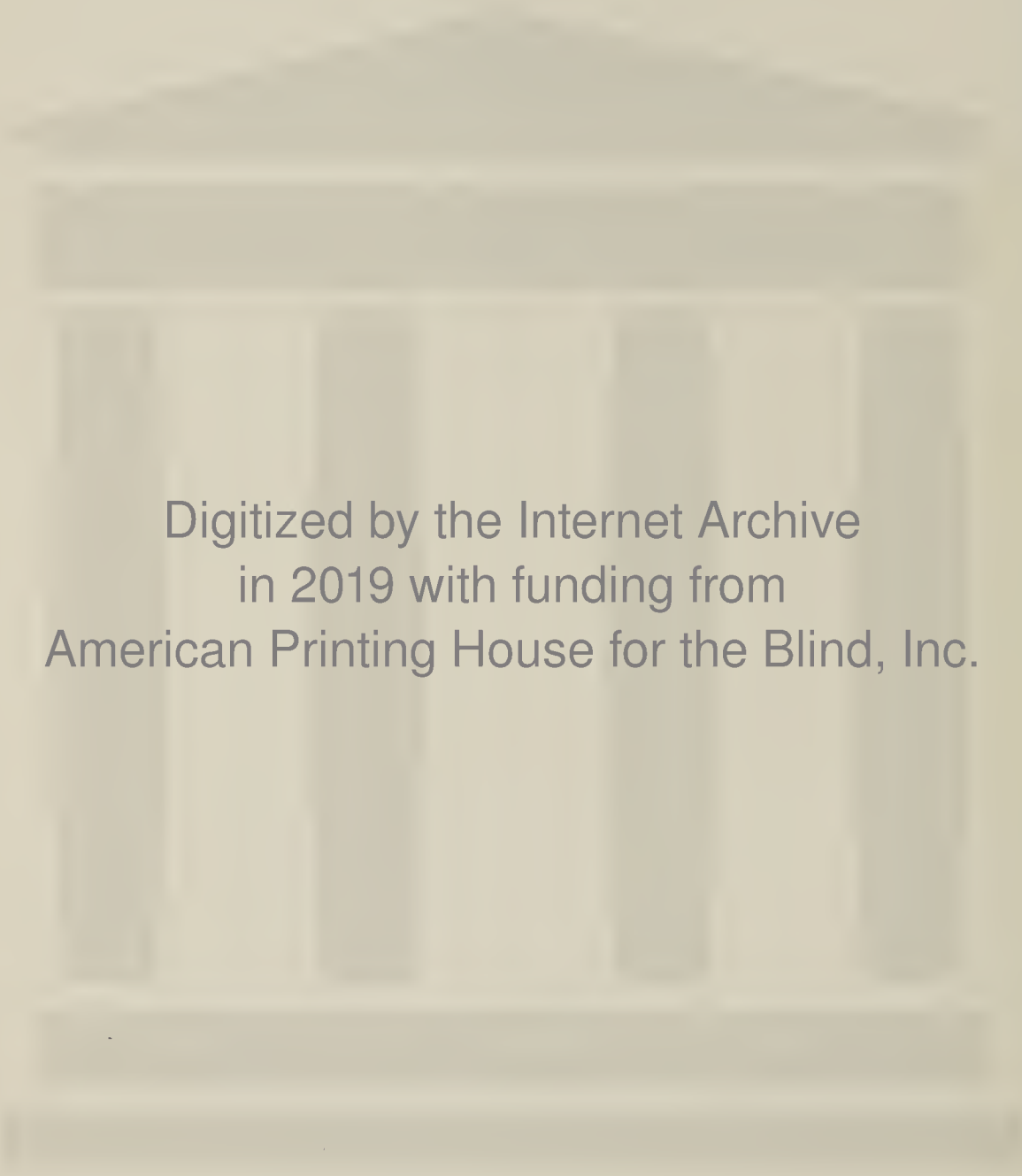


# SENTINEL

1979-80

A A W B

ANNUAL



Digitized by the Internet Archive  
in 2019 with funding from  
American Printing House for the Blind, Inc.

<https://archive.org/details/blindnessaawbann1979amer>

362.41  
amer2  
1979-80

154

PROFESSIONAL LIBRARY  
AMERICAN PRINTING HOUSE FOR THE BLIND  
LOUISVILLE, KENTUCKY

# BLINDNESS

1979-80



AMERICAN ASSOCIATION OF WORKERS FOR THE BLIND, INC.

ANNUAL

\$6.00 per copy.

1511 K Street, N.W., Washington, D. C. 20005

Accession No. 1195  
April 10, 1980

1195

The opinions expressed in articles appearing in  
BLINDNESS are those of the authors thereof, and do  
not necessarily reflect those of the American  
Association of Workers for the Blind

Copyright 1980  
by the  
American Association of Workers for the Blind  
Library of Congress Catalog Card Number: 64-24006  
Printed in the United States of America  
Washington, D.C.



TABLE OF CONTENTS

|                                                                                                                                                                             |      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
|                                                                                                                                                                             | Page |
| KEYNOTE ADDRESS<br>at the<br>1979 Biennial Convention<br>American Association of Workers for the Blind, Inc.<br>Oklahoma City, Oklahoma<br>July 15-19, 1979                 |      |
| THE CHALLENGE OF EDUCATION AND REHABILITATION<br>IN THE COMING DECADE . . . . .                                                                                             | 1    |
| BERTHOLD LOWENFELD, Ph.D.<br>Superintendent-Emeritus,<br>California School for the<br>Blind, Berkeley, Calif.                                                               |      |
| A WASHINGTON VIEW OF LEGISLATION FOR THE 80'S                                                                                                                               | 14   |
| OUR CHALLENGE IN THE DECADE OF THE 80'S . . . . .                                                                                                                           | 14   |
| ROBERT J. WINN, JR., Dir.<br>Bureau of Blind and Visu-<br>ally Handicapped, Rehabili-<br>tation Services Administra-<br>tion, Dept. of Health, Edu-<br>cation, and Welfare  |      |
| A PHYSICIAN'S VIEW OF PREVENTION OF BLINDNESS AND<br>RESTORATION OF VISION IN THE DECADE AHEAD                                                                              | 21   |
| PREVENTION OF BLINDNESS AND RESTORATION OF<br>VISION IN THE 1980'S . . . . .                                                                                                | 21   |
| G. A. THOMPSON, M.D.,<br>F.R.C.S.(C), National<br>Consultant, Canadian<br>National Institute for<br>the Blind                                                               |      |
| NEW APPROACHES TO LOW VISION SERVICES                                                                                                                                       | 36   |
| LOW VISION ENTERING THE 1980'S . . . . .                                                                                                                                    | 36   |
| ROBERT D. QUILLMAN, Chief<br>Visual Skills Section and<br>GREGORY L. GOODRICH, Research<br>Psychologist, Western Blind<br>Rehabilitation Center, Palo<br>Alto, Calif. 94304 |      |
| COMMUNICATION SKILLS                                                                                                                                                        | 51   |
| MODERN TECHNOLOGIES APPLIES TO COMMUNICATIONS<br>FOR THE BLIND . . . . .                                                                                                    | 51   |

|                                                                                                                                                                                 | Page |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| E. L. GLASER, Vice Pres.<br>& Chief Technical Officer<br>System Development Corp.<br>Santa Monica, Calif.                                                                       |      |
| COMMUNICATION AIDS FOR THE BLIND . . . . .                                                                                                                                      | 60   |
| HARVEY LAUER, and LEONARD<br>MOWINSKI, Blind Section<br>117A Veterans Administration<br>Medical Center, Hines, Ill.                                                             |      |
| THE MULTIDISCIPLINARY APPROACH TO<br>BLIND REHABILITATION                                                                                                                       | 73   |
| GIVING LIFE TO INTEGRATION . . . . .                                                                                                                                            | 73   |
| ROD MICHALKO, Dept. of<br>Anthropology, University of<br>British Columbia, and ROBERT<br>F. MERCER, Execu. Dir., The<br>Canadian National Institute<br>For the Blind, Vancouver |      |
| THE ROLE OF THE REHABILITATION TEACHER                                                                                                                                          | 96   |
| REHABILITATION TEACHING: DEVELOPING A PROFESSIONAL<br>CHARACTER, CONFRONTING ISSUES, AND PLANNING<br>POSITIVELY FOR THE FUTURE . . . . .                                        | 96   |
| ROBERT G. UTRUP, Rehab.<br>Teacher, Mich. Rehabilita-<br>tion Center for the Blind,<br>Kalamazoo, Mi.                                                                           |      |
| ORIENTATION AND MOBILITY                                                                                                                                                        | 118  |
| ORIENTATION AND MOBILITY COME OF AGE . . . . .                                                                                                                                  | 118  |
| WILLIAM R. WIENER, Coor.<br>of Blind Rehabilitation,<br>Cleveland State Univ.,<br>Cleveland, Ohio                                                                               |      |
| THE VISUALLY IMPAIRED DIABETIC AND THE IMPLICATIONS FOR<br>ORIENTATION AND MOBILITY INSTRUCTION . . . . .                                                                       | 149  |
| KENT TYLER WARDELL,<br>Instructor, Orientation<br>and Mobility Program,<br>Calif. State Univ. at<br>Los Angeles, Calif.                                                         |      |

## PUBLICATIONS BOARD

Chairperson: Dr. George G. Mallinson  
3409 Sangren Hall  
Western Michigan University  
Kalamazoo, Mi. 49008

## MEMBERS

Mary K. Bauman, Director  
Nevil Interagency Referral Services  
Room 400, 919 Walnut Street  
Philadelphia, Pa. 19107

C. Warren Bledsoe  
5811 Irvington Avenue  
Bethesda, Md. 20034

Dr. John R. Eichorn, Chairperson  
Department of Special Education  
and Rehabilitation  
Boston College  
140 Commonwealth Avenue  
Chestnut Hill, Ma. 02167

Richard Evensen  
Library of Congress  
1291 Taylor Street, Northwest  
Washington, D.C. 20542

Henry N. Gates, Coordinator  
Information National Public Relations and Information Services  
Canadian National Institute for the Blind  
1929 Bayview Avenue  
Toronto, Ontario, Canada M4G 3E8

James Liska, Coordinator  
Blind Rehabilitation Program  
University of Arkansas at Little Rock  
33rd and University  
Little Rock, Ar. 72204

Mary Ellen Mulholland, Director  
Publications and Information Service Department  
American Foundation for the Blind  
15 West 16th Street  
New York, N.Y. 10011

Robert G. Utrup, Rehabilitation Teacher  
Michigan Rehabilitation Center for the Blind  
1541 Oakland Drive  
Kalamazoo, Mi. 49008

Dr. Richard L. Welsh, Superintendent  
Maryland School for the Blind  
3501 Taylor Avenue  
Baltimore, Md. 21236

AAWB

OFFICERS AND EXECUTIVE COMMITTEE

PRESIDENT

Jerry Dunlap  
Oklahoma City, Ok., USA

PRESIDENT-ELECT

William Coppage  
Richmond, Va., USA

SECRETARY

Roger Rouse  
Winnetka, Il., USA

TREASURER

William Gallagher  
New York, N.Y., USA

IMMEDIATE PAST PRESIDENT

Mary K. Bauman  
Philadelphia, Pa., USA

J. Claude Gauthier  
Regina, Saskatchewan, CANADA

Arlene Gordon  
New York, N.Y., USA

David Loux  
Morristown, N.J., USA

William Milton  
Toronto, Ontario, CANADA

Harold Richterman  
Hempstead, N.Y., USA

Richard Schuricht  
Columbus, Oh., USA

EXECUTIVE DIRECTOR

John H. Maxson  
Washington, D.C., USA

## INTRODUCTION

BLINDNESS 1979-80 is the fourteenth issue of an annual published by the American Association of Workers for the Blind. Some of the articles that are included were solicited papers. Others were presented at the 1979 Biennial Convention of the American Association of Workers for the Blind, Inc. that was held in Oklahoma City, Oklahoma, July 15-19, 1979. As with previous issues of BLINDNESS many of the articles were prepared to deliver orally and it was necessary to edit some of them to bring them into article style. Every effort was made to respect the integrity of the original presentation.

The articles fall under the following major headings:

- A. A Washington View of Legislation for the 80's
- B. A Physician's View of Prevention of Blindness and Restoration of Vision in the Decade Ahead
- C. New Approaches to Low Vision Services
- D. Communication Skills
- E. The Multidisciplinary Approach to Blind Rehabilitation
- F. The Role of the Rehabilitation Teacher
- G. Orientation and Mobility

As with previous annuals, it is hoped that BLINDNESS 1979-80 reflects the movement of human thought with respect to blindness and stimulates original thinking and excellence of practice in the field.

Copies of BLINDNESS 1979-80 are distributed to members of the Association as a function of membership. The Library of Congress, Division for the Blind and Physically Handicapped, will make the annual available through regional libraries in both braille and recorded form.

George G. Mallinson, Editor



KEYNOTE ADDRESS  
at the  
1979 Biennial Convention  
American Association of Workers for the Blind, Inc.  
Oklahoma City, Oklahoma  
July 15-19, 1979

*The Keynote Address at the 1979 Biennial Convention was given by Dr. Berthold Lowenfeld whose reputation in the field of services for the blind spreads far beyond the borders of the United States and Canada. He has been a teacher of blind children, a Rockefeller Research Fellow, Director of Educational Research for the American Foundation for the Blind, Superintendent of the California School for the Blind, and is an accomplished writer in his field. The challenge emphasized in his presentation is that of the optimal implementation of legislation related to services for the visually handicapped in the decade of the '80s.*

THE CHALLENGE OF EDUCATION AND REHABILITATION  
IN THE COMING DECADE

by

Berthold Lowenfeld, Ph.D.  
Superintendent-Emeritus  
California School for the Blind  
Berkeley, California

If one wants to discuss what lies in the future, one engages by necessity in predictions of things to come. Such predictions can be derived from facts already known or deal with unknown or unforeseeable events. An example may make this clear. In 1939 nobody could foretell that the forthcoming decade of the forties would bring a tremendous increase in blindness among young children. But, in 1949 it was entirely predictable that the number of blind children seeking an education would greatly increase during the next decade because retrolental fibroplasia was already rampant among prematurely born infants.

In my address I propose to discuss only predictions of the latter kind and not to engage in speculation of what cannot be foreseen, although this may turn out to be more influential than anything that can be predicted. With this mental reservation, I am almost



ready to start on my deductive conclusions about challenges in the coming decade for education and rehabilitation in work with the blind. The "almost" is caused by my search for a definition of a word that is so facilely used in the title of my address, I mean the word "challenge." When I looked it up in my Webster's New Collegiate Dictionary, I found seven common uses of this word, but none that really satisfied me. So I explained it myself, at least for the purpose of this address, as "challenges are opportunities with problems." Opportunities per se would not challenge anybody--you can just use them--but the problems associated with them convert them into challenges.

Now what happened during the decade of the 1970's that we can use to determine the course of events during the next decade? I believe that it can well be characterized as a decade of essentially important legislation. To mention the most important public policy documents of the seventies--at this point only in a general way--it was for education Public Law 94-142, the Education for All Handicapped Children Act of 1975, and for rehabilitation the Rehabilitation Act of 1973 and the Rehabilitation, Comprehensive Services, and Developmental Disabilities Amendments of 1978 (Public Law 95-602).

Public policy, of which the law is a distillation, has always been well-intentioned toward the blind. The principle of equality and the expressed will to be "one people with liberty and justice for all" have created a climate that is favorable to those who are disadvantaged. Equality and justice seem almost to demand that inequalities and injustices be reduced as much as humanly possible. The law as an instrument of justice often manifests the noblest aspirations of the people. Emotional as well as attitudinal forces, so potent in daily life, are subdued and give way to the expression of the best intentions of the nation. Thus it can be observed that, particularly in the field of minority legislation, the law has generally been ahead of the people, sometimes by generations. It is semantically significant that we say we have to "live up to the law" (Lowenfeld, 1975).

The legislative provisions passed during the decade of the 1970's are far-reaching and set new goals for education and rehabilitation for many years to come. Thus I believe that the 1980's will challenge us to implement these laws and make them a reality that will change the lives of blind people for the better in every aspect--social, economic, intellectual, and recreational; in short, assist them in the legitimate pursuit of their happiness. There will be probing, testing, and interpretation of the law as it is written, and the blind and their advocates must see to it that whatever advantages can be gained will be gained. Goethe, the great German poet and writer, said: "Whoever feels within himself that he can produce something good must be a nuisance. He must not wait until he is called upon, he must not mind if he is sent away. He must be, what Homer praised in his heroes--he must be like a fly that, if chased away, attacks the person again and again from a different side."

Having stated the general trend that I expect will dominate work with the blind in the coming decade, I now intend to turn to specific issues that result from these trends.

## Education

In education it is of course P.L. 94-142 that awaits implementation. This law did not spring from the head of Congress like Pallas Athena from the forehead of Zeus, but has its roots in the equal protection doctrine and its application under the Warren Supreme Court. From Brown versus Board of Education of Topeka, Kansas (1954), the desegregation decision establishing the right to an equal educational opportunity; to Pennsylvania Association for Retarded Children versus Pennsylvania (1971), requiring that all retarded children must be placed in a free public program of education and training appropriate to the child's capacity; to Maryland Association for Retarded Children versus Maryland (1974), requiring local and state school authorities to provide a free appropriate public school education to children with handicaps regardless of the severity of their handicap; and to P.L. 91-517, the Developmental Disabilities Assistance and Bill of Rights Act (1974) there is a straight line to the Education for All Handicapped Children Act of 1975 (Turnbull & Turnbull, 1978). All these decisions are based on the conviction that family and community living have a normalizing effect on children with handicaps.

What are the essential provisions of this far-reaching Act? There are three elements that make it up:

1. Education for handicapped children must be provided in the least restrictive educational program;
2. Education must be free and suitable (appropriate):
3. Education must be individualized, and the Individualized Education Program (IEP) is the instrument to achieve this.

In all three of these basic provisions are many points that need explanation and can cause problems.

The "least restrictive" educational environment logically assumes that there are other environments that are more restrictive. In fact, one can easily construe a series of provisions according to their degree of restriction, say from regular class to state institution. Some court decisions have already stated "that regular classroom instruction (with auxiliary services if necessary) is preferable to separate special classes, which in turn are preferable to homebound instruction (Turnbull & Turnbull, 1978, p. 111)." It is obvious that for many handicapped children, placement in a residential school is not the "least restrictive" choice, although in some states this is still almost the only one that parents are given for their visually-handicapped child. In general, however, our field is, insofar as educational integration is concerned, in a much better position than almost any other special-education branch. This is due



to the long history and the trend of development of public-school education for visually-handicapped children.

The first attempts to place blind children in public school settings were made in Scotland in 1834, and later in London, but they did not result in any lasting arrangement. In the United States, the first class for blind children in a public school opened in Chicago in 1900, as a result of the efforts of John B. Curtis and Edward J. Nolan who were blind themselves, and Frank H. Hall, the inventor of the first braille writer and of the stereotyping machine for braille printing. This was a "braille class" and blind children were segregated for most of the day. The prevailing trend, however, was from separation to integration due to the leadership of such educators as Robert B. Irwin of the American Foundation for the Blind, George F. Meyer of New Jersey, Florence Henderson of San Francisco, and George Lee Abel of the American Foundation for the Blind and San Francisco. Braille classes developed into cooperative classes, into resource rooms, and into regular classroom placement with either resource teachers or itinerant teachers available. In 1978, 76% of the legally blind children in the United States received their education in public schools and only 24% attended residential schools (American Printing House for the Blind, 1978). It can be well supported that our field pioneered integrated education and developed such now generally accepted provisions as the resource room and the resource teacher.

If the provisions of P.L. 94-142 are enforced--and this may need pressure and eventually litigation by parents and concerned professionals and their organizations--schools for the blind will change their character and become least restrictive resources only for those children who cannot make use of public-school programs. They may also turn into temporary adjustment centers for those who may need some concentrated individualized training in some special skill. Here I see a challenge to the flexibility and service-readiness of our residential school administrators and staffs.

Education must be appropriate, that is it must meet the needs of the child. Obviously, just being placed in a regular classroom may be least restrictive but may certainly not be appropriate. There are some blind children, mostly older ones, who have had appropriate education and can therefore fend for themselves, needing only occasional assistance. But the great majority of all blind children will need the help of teachers who are especially trained in the education of the visually handicapped. This includes not only braille and mobility instruction, but also the understanding of the more subtle effects of blindness and being conversant with the support services needed by pupils according to their age, degree of visual impairment, and capabilities. Teachers of regular classrooms who received their education in the past do not know about this. Teacher training of the future will need to include more knowledge about handicapped children, either by adding courses concerning them to the regular course of study, or by infusion of such knowledge into all or most courses required for graduation or credentials. The danger is that such non-specific training will be considered sufficient for teaching

special groups of handicapped children or that special teachers will be trained in dealing with all kinds of handicaps, what we used to call in past days "general specialists." We must all be alert to avoid such simplifications and preserve for future generations of children with specific handicaps appropriately trained special teachers.

The "individualized education program" (IEP) is required for every handicapped child to assure that he/she receives an education that is individually suitable and appropriate. IEP's are written statements that include:

1. The child's present level of educational performance;
2. Annual goals and short term instructional objectives;
3. Specific educational services to be provided an expected participation in regular educational programs;
4. Projected dates for initiation and duration of such services;
5. Objective criteria and evaluation procedures, and schedules for determining, at least annually, whether the instructional objectives are being met.

IEP's are developed in meetings in which the following persons must be involved: a representative of the supervising public agency, the teacher, one or both of the child's parents, and, when appropriate, the student. Also, when a child is first evaluated, a member of the evaluating team or someone should be present who can explain evaluation procedures and interpret their results. The IEP is of basic importance to the individual integration of handicapped children into regular educational facilities. As Reynolds (1978) has noted, "The schools, clearly, must establish the suitable conditions for the instruction of handicapped pupils; and the schools and teachers must recognize that they are going to be held accountable for competent performance (p. 62)."

The IEP has created more controversy and anxiety than any other part of the new legislation and the rules and regulations that have been promulgated. The unprecedented use of teamwork including parents and the child, the fact that decisions are being made or influenced by educational "outsiders" who may lack objectivity, the scheduling problems, the economic factors involved, doubts about the validity of available assessment instruments, and many other problems have been cited. But whenever the IEP has been put to a practical test, most difficulties have been overcome. Teachers must remember that rehabilitation has for many years used individualized written rehabilitation planning by teams including the client, and if desired by him/her, the client's legal representative. These individualized rehabilitation plans have stood the test of time and have become a valuable part of the rehabilitation process.

There are two groups of visually-handicapped children who have been the almost forgotten or forgotten ones among our children insofar as services are concerned. Almost forgotten were the pre-school, and forgotten the gifted and talented visually-handicapped children.

If services for preschool visually-handicapped children were not provided by some private agencies, public agencies offer them only in a few states, and in most cases they are inadequate. Inadequate services are often worse than none because they are used as an excuse for providing anything better. In fact, special education for children from birth on is mandated only in five states: Iowa, Maryland, Michigan, Nebraska, and South Dakota; and for the age group from 3 through 5 years in additional eight states, with not all of them actually serving all children (Cohen, Semmes, & Guralnick, 1979).

Section 504 of the Rehabilitation Amendments of 1973 prohibits discrimination against handicapped persons not only in employment and in social and health services, but also in education, indeed on all levels, from preschool to adult education. According to Section 504, it would be discriminatory if a state would provide preschool education for children in general and not also for its visually-handicapped children. Section 504 applies only to recipients of Federal grants and other financial assistance. But before the 1970's are over, we may see that discrimination against the handicapped is generally prohibited as a part of the protection under the Civil Rights Act of 1964. Insofar as age coverage is concerned, P.L. 94-142 does not go so far as Section 504. It makes it mandatory, only under certain conditions, that free appropriate public education be provided for children age 3 through 5.

The Elementary and Secondary Education Act of 1978 (P.L. 95-561) demands in its Title III a new preschool partnership program with Headstart. The Office of Education and Headstart could under this program provide early intervention to serve the needs of visually-impaired children of preschool age. Another promising Federal innovation is the directive given to the new National Institute of Handicapped Research "to conduct a model research and demonstration program to develop innovative methods of providing services for pre-school age children, including early intervention, parent counseling, infant stimulation, early identification, diagnosis, and evaluation (AFB Washington Report, December 1978, p. 3)." It will be a challenge to us to make certain that the best possible services are extracted from these new provisions. Those of us who are engaged in preschool work know how important it is to assist parents and their child at an early age, and we must press for such services by well-trained experts as a challenge of utmost importance.

The gifted and talented have been with us, in public and residential schools for a long time and we have enjoyed them. But have we done everything possible to assist them in using their gift and talents? We have in most instances let them fend for themselves.



The Gifted and Talented Children's Education Act of the Education Amendments of 1978 includes provisions that should be of great help in meeting the educational needs of these children, including those who are visually handicapped. Here is an area where the basic work remains to be done, and it will be rewarding effort. There is a provision in the Act that state education agencies give technical assistance to smaller local education agencies that are unable to compete, lack financial resources, and are unable to prepare proposals or plan, develop, and operate programs. This appears to be particularly applicable to some special-education programs including those for visually-handicapped children.

Compliance with P.L. 94-142 will come during the 1980's, either by inside evolutionary forces or by outside imposition. An example of inside forces is given by the state whose Department of Finance demanded to know whether the administration of a certain state residential school showing a large enrollment was in compliance with P.L. 94-142. Outside imposition would occur as a result of legal action by parents or parent groups, so successfully applied in the Pennsylvania and Maryland court decisions. How much better it would be if those responsible for determining the functions and policies of residential schools would recognize the trend of the future and adjust to it by reviewing the role of the residential school to make it meet changing demands! A few states, prominently among them California, Illinois, Michigan, and New Jersey have already done this in the past, but all will have to adjust to new realities in the 1980's.

On the other hand, for some visually-handicapped children, particularly those with additional handicaps, placement in a public school may be neither least restrictive nor most appropriate. If a child cannot take part in the regular classroom activities and has no social contact with his peers, he/she may be better off in a residential school. There he/she may receive more individualized attention and can gradually become a member of his peer group. His/her placement in a residential school may be long range or only temporary, according to his/her progress that will be monitored regularly through his/her IRP.

There are indications that under the exhilarating and tempting influence of P.L. 94-142 some may go too far and place children in public schools, for whom another placement would be more appropriate and productive. As educators we are committed to provide for each child the educational environment that will be most conducive to the full development of his/her intellectual, emotional, social, and creative potential--regardless of our own theoretical preference.

From what I have tried to explain so far, it can be seen what I consider the challenges in the field of education of blind children for the coming decade. But, I have not yet mentioned all of them. There are a few that education has in common with rehabilitation that I will discuss after I have dealt with the challenges that confront rehabilitation.



## Rehabilitation

Legislation in the field of rehabilitation was in the 1970's not so sweeping and almost revolutionary as in the field of education. But, let no one believe that the changes it demands are not sufficiently sweeping to pose intense challenges that will test the ingenuity and organizational capability of all its personnel.

The Rehabilitation Act of 1973 is by now a reality with which many of us have already learned to live. Besides its administrative provisions, it contains many features that will continue to challenge us into the 1980's. Among its most important are the following: priority in services must be given to the most severely handicapped which includes the blind; the handicapped individual must be a full participant in the development of his individualized written rehabilitation program, with regular reviews of the program in light of a long-range vocational goal, and with specified intermediate objectives; consultation with handicapped clients is required in the evaluation of service programs; it authorizes rehabilitation teaching and orientation and mobility services for the blind as well as telecommunications, sensory, and other technological aids and devices; it also authorizes provision of any rehabilitation service for up to 18 months in the evaluation of rehabilitation potential (AFB Washington Report, October, 1973). In addition the 1973 Act contains Sections 501, 503, and, as already mentioned, Section 504 that prohibit discrimination against handicapped persons in Federal employment, by Federal contractors, and by recipients of Federal grants, and other Federal financial assistance.

Of even greater influence on the lives of thousands of visually-handicapped people may be the rehabilitation legislation that became law in 1978, P.L. 95-602, the Rehabilitation, Comprehensive Services, and Developmental Disabilities Amendments of 1978. This law authorizes a program that was sought for many years by workers with the blind, namely comprehensive services for independent living rehabilitation for handicapped individuals who can profit from them, even if they are not potential vocational rehabilitants. Closely related to this is a program of independent living rehabilitation for older blind persons regardless of their employment potential. It will take many years to make these provisions fully effective.

The Rehabilitation Act of 1978 has many other features that will make improved services to the blind possible. It authorizes grants to private non-profit agencies or national organizations to provide reader services to blind individuals not eligible for such services through other governmental programs. Such grants can be given for educational pursuits or to obtain and continue employment. Reading services include a wide range of assistance from engaging a person to read aloud, to mechanical or electronic equipment that provides access to printed materials. Radio reading services for blind persons are also covered. This Section 314 of the Act should enable practically any blind person to secure reading assistance suitable to his individual needs, either for study purposes or for employment.

The Act also provides grants to initiate recreation programs designed to advance the mobility and socialization of handicapped individuals. Scouting, camping, 4-H, sports, music, arts, and other activities are included. Such programs can also be offered to children during after-school hours.

The Act also includes provisions for the establishment of state information and referral programs to assist handicapped individuals. From our midst it has been suggested that a free toll number (800 number) be provided for the specific purpose of giving by telephone information on whatever service the calling person may require. If other Federal offices such as Social Security and the Internal Revenue Service do have such an information service, visually-handicapped persons would even more patently be entitled to it. This could also provide employment for some visually-handicapped service personnel.

Of great potential influence in the future is the establishment of the National Institute of Handicapped Research (NIHR), similar to such already existing Institutes as the National Institutes of Health, the National Science Foundation, and the National Institute of Education. The NIHR will have a broad program of research in coordination and cooperation with other governmental agencies and will have its own research staff as well as the authority to fund research contracts with non-profit and profit-making private agencies. P.L. 95-602 also establishes in the Department of Health, Education, and Welfare the National Council on the Handicapped as a consultative, reviewing, and evaluating body. It is required to submit annual reports to the President, the Congress, and the Secretary of HEW on rehabilitation research, the Rehabilitation Services Administration, and the new NIHR. At least 5 of its 15 members must be handicapped themselves or parents or guardians of handicapped persons.

The newly established Title VII includes the already mentioned expanded services to older blind persons through the state rehabilitation agencies or state agencies for the blind. Title VII consists of three "Comprehensive Services for Independent Living" programs: (1) comprehensive services for independent living; (2) centers for independent living; and (3) independent living for the older blind. Older blind persons are defined as individuals "aged 55 or older whose severe visual impairment makes gainful employment extremely difficult to attain but for whom independent living goals are feasible." Thus, while an employment goal is quite properly not ruled out, essentially the same wide range of services that is available to rehabilitants can now be secured for or by the older blind.

The Act also extends the client assistance program to include assistance in enforcement of rights, and it grants handicapped persons the same rights and remedies as those conferred upon racial and religious minorities under Title VI of the 1964 Civil Rights Act.

The 1978 Rehabilitation Act authorizes in addition a number of other services and grants, as for instance, grants for continuous

staffing of rehabilitation facilities; grants for establishment and operation of advocacy systems; a study of the needs of handicapped individuals who live in rural areas; and, as already mentioned, services to preschool children.

When we review the challenges that legislation of the 1970's pose for rehabilitation in the 1980's, we must not overlook the built-in demands of its basic purpose: the relentless pursuit of employment for the handicapped. This will, I think, continue to be achieved mainly in four ways:

1. By improved vocational or professional preparation of the visually-handicapped client;
2. By sharpening the professional skills of rehabilitation personnel and improving rehabilitation facilities;
3. By improving employer readiness to accept visually-handicapped employees;
4. By application and use of all technological advances and instruments.

Nothing confirms the dignity of the individual more strongly than productive employment, not only for its economic value but also for its social and psychological impact.

#### Challenges Common to Rehabilitation and Education

Let me first call to your attention the most obvious area in which both are involved, that of *coordinating both service delivery systems* in the most effective way. Rehabilitation has had for a long time the mandate to assist the young blind by vocational guidance, counseling, and other services. The Rehabilitation Act of 1978 includes a special provision concerning the coordination of services of the Rehabilitation Act, the Education for All Handicapped Children Act, and the Vocational Education Act. It must be hoped that the next decade will see this coordination become an effective reality so that all visually-handicapped children, in whatever facility they are placed, will receive the full benefits of these services and reach, each on his own level, the optimum of their employability.

The visually handicapped are a *low-incidence* group. This is a happy fact because blindness is, in many situations, a severe handicap. We owe this happy fact to medical advances, to prevention of blindness and restoration of vision efforts, and perhaps also to Mother Nature who may have laid it out for the blind to be a low-incidence group. But fortunate as this fact is, its consequences cause problems in a world of realities where numbers count. Particularly is this the case when the low-incidence group is also a high-skill demanding group. Our field has developed at least three specialists who are indispensable in education and in rehabilitation:



the home teacher now called rehabilitation teacher, the resource teacher, and the mobility instructor. These specialists have been adopted by other fields, but stand as signposts that education and rehabilitation of the visually handicapped cannot be performed by "generalists." Only specialized personnel have acquired the knowledge and skills that are needed in the education and rehabilitation of the visually handicapped. As a psychologist, but also as one who has been concerned with the blind and blindness for more than fifty years, I place first, the understanding of the cognitive and emotional effects of blindness. They must be studied and experienced in practice before one can truly meet the special psychological needs that result from visual impairment. But there are also skills that must be known or mastered. Besides mobility techniques, braille, braille music notation, and the mathematics code, there is a wide variety of support services with which teachers and rehabilitation specialists must be familiar so that their pupils and clients may have full access to them when they need them.

There is at present, as there has been at times in the past, a trend toward generic, that is non-specific, services and generic organizational units in education as well as in rehabilitation. We must resist this trend militantly, backed up by a history of long and successful experiences of the past and present. This is a definite challenge of the eighties and we must succeed in meeting it!

Another problem area that education and rehabilitation share is that of *financial support* for the enacted provisions. There are many laws and provisions on the statute books that remain of only theoretical value because no financing has been provided for them. It would be ideal if we could gain consensus on a priority list for those items already enacted that we consider prime necessities for financing. But consensus on such questions is usually difficult to achieve. What seems to be one person's bread is another person's cake. Nevertheless, there are certain basic items for which appropriations must be made, and on these we should concentrate.

We have often proclaimed, and like to consider ourselves *advocates* of the rights of the blind. It is my conviction that such claim will sound hollow until we are also willing to go to court when rights are denied. Shall we leave it forever to the National Federation of the Blind to remain practically the only organization that will defend the rights of the blind by being ready to litigate? There are, of course, many steps that can and must be taken short of litigation, but does it not seem incongruous with our claim of being advocates that we shirk from the responsibility of taking the last and in some cases most important step of going to court?

It is indeed fortunate that many of the newly enacted laws that will govern education and rehabilitation for years to come have built-in procedures for redress. The Rehabilitation Act of 1978 authorizes, under its new Title VII, grants to states for the establishment and operation of protection and advocacy systems for handicapped persons. P.L. 94-142 also requires that State educational



agencies and public agencies must adopt due process procedures to safeguard the rights of handicapped children and their parents. These procedural safeguards include due process hearings before impartial and qualified hearing officers. The various measures of protection and advocacy are imbedded in the often legal verbiage of the various Acts and are not easily accessible nor understandable for the lay person whom they are supposed to assist. It is my suggestion that a guide to all these legal provisions be prepared as a first step toward our active involvement in client protection and advocacy. The American Foundation for the Blind could render a valuable service to the blind as well as to the legal profession by having such a guide compiled and published. It should be written in straight terms but also include the documentation and citations that a lawyer will need in order to prepare his case.

It is easy to foresee that educational as well as rehabilitation research will be financed and conducted increasingly in the 1980's. The National Institute of Education and the National Institute of Handicapped Research will each have in the next years appropriations of more than 100 million dollars. This will allow substantial research activities with a scope wide enough to cover basic as well as applied research. The NIHR has a mandate to include research related to telecommunication systems and other technical advances. Thus we have justifiable hopes that the new technology of the space age will have beneficial fallouts for our field. This is not the place to speculate about what we may see as a result of the increased research efforts, but we must hope that a reading device and a guiding device will be produced that are usable by all the blind and also affordable for them. With all due respect for the instruments that have been designed so far, I believe they are only steps--maybe indispensable ones--toward the final products.

I would be amiss if I did not include in our challenges of the 1980's *medical research* and *prevention of blindness*. Both are related fields and have given us immense advances in the past decades. The conquest of retrolental fibroplasia and rubella, and before, the conquest of smallpox and syphilis, both major causes of blindness when I entered the field, are glorious examples. The National Eye Institute has a comprehensive program of research on vision and its disorders (National Advisory Eye Council, 1978), and its results will certainly contribute to decrease the incidence of blindness and the severity of unavoidable visual handicaps, our utmost goals!

I am at the end of my presentation. I have not reported to you any challenges that will require heroic actions or sacrifices--the unforeseeable events may call for them, although we hope they will not. It is the challenge of our everyday work, the unyielding commitment to it, that my forecasts demand. Let me conclude with a story that some of you may know, but all of you will know how to apply: Back in the twelfth century, somewhere in Italy, a passerby saw two workmen laying bricks. He asked them what they were doing. One man said: "I am laying bricks." The other said: "I am building a cathedral."

## References

- American Printing House for the Blind. One Hundred and Tenth Report. Louisville, 1978.
- Cohen, S.; Semmes, M.; and Guralnick, J. M. Public Law 94-142 and the education of preschool handicapped children. Exceptional Children, January 1979, 45 (4), 279-85.
- Lowenfeld, B. The changing status of the blind: From separation to integration. Springfield, Ill.: Charles C. Thomas, 1975.
- National Advisory Eye Council. Vision Research: A National Plan: 1978-82. Washington: DHEW Publication No. (NIH) 78-1258, 1259, 1978.
- Reynolds, M. C. Staying out of jail. Teaching Exceptional Children, Spring 1978, 10 (3), 60-62.
- Turnbull, H. R., and Turnbull, A. Free Appropriate Public Education: Law and Implementation. Denver: Love Publishing Company, 1978.

## A WASHINGTON VIEW OF LEGISLATION FOR THE 80'S

*When this article was prepared, Dr. Winn had served as Director of the Bureau for Blind and Visually Handicapped for less than a year. Consequently, he brings a fresh view to the Washington scene in terms of his thoughts for relevant legislation for the decade of the 80's. His ideas for dealing with the system and the bureaucracy indicate his awareness of some of the obstacles that need to be overcome.*

*The article implements the keynote presentation admirably in that the keynote emphasized the implementation of legislation now "on the books" whereas this one places more emphasis on needed legislation at a time of less than affluent resources.*

## OUR CHALLENGE IN THE DECADE OF THE 80'S

by

Robert J. Winn, Jr., Director  
Bureau for Blind and Visually Handicapped  
Rehabilitation Services Administration  
Department of Health, Education, and Welfare  
Washington, D.C. 20201

We know much of what needs to be done with respect to services for the handicapped but it is our challenge in the decade of the 80's to implement those needs. I believe very strongly in this statement. When history is recorded concerning services to the handicapped, and specifically services to blind persons, we will look at the past two decades as a period of expansion and growth in methodology and services, and the development of a higher level of technology. It will be considered a period of the development of some of the most advanced sophisticated technology of our civilization, much of which has been directed towards assisting blind children and adults. It is important to recognize legislative mandates and correlate them with these technological and methodological advances. So, what we can say for the past two decades is that we have learned most of what needs to be done. I think the real challenge of the 80's is to meet those needs to the maximal extent.

This evening, at the Biennial Meeting of the AAWB, I shall not deal with the details of the new 1978 amendments to the Rehabilitation Act which broaden the concept of rehabilitation to include vocational rehabilitation, and social rehabilitation. Rather, I shall



discuss other areas that interface with that legislation such as P.L. 94-142 Section 504 of the Rehabilitation Act and the Randolph-Sheppard Act of 1974. In the 80's we must look at ways to implement that legislation and identify what we have the mandate to achieve.

At the outset, I would like to mention some of the more important methodologies on which the Bureau for Blind and Visually Handicapped (BBVH) in the Rehabilitation Services Administration (RSA) will work cooperatively with you so that we will do what we know should be done. One of the most important strategies that has been initiated and will increase in the 80's is for BBVH to take what I call a "strategic approach" in achieving our goals. Many of you will recognize that term, especially the state agency directors who will remember that some six or eight months ago during our conference in California, we discussed the whole area of strategic management. To those of you who are not familiar with this concept, it is based upon military theory of execution--military management, management that is pragmatic, management that reaches the heart of what has to be done and delineates the strategy of how to do it.

It is easy for anyone to stand back and say, "This is what we should do." It is much more difficult for someone to come forth and say how we are going to do it. Strategic management with its strategic approach provides us not only with a major type of strategy, but with attitudes as well. For some of you that are ex-military you might say, "Well what does this have to do with war? What does this have to do with killing an enemy?" I think that we have to look at these terms openly in applying a new approach to the human service field.

A number of years ago, in the late 60's, when some of us went to Washington for the first time and were thrown in with the DOD experts on the PPBS that is a form of management of the military, we were astounded. They were talking about tanks and guns, all of which was foreign to us. But, let me say from a military approach, we do have enemies. We have enemies that must be conquered. Our enemies are in the form of prejudice toward blind persons. Our enemies are in the form of the lack of financial resources that we now face and will face even more so in the 80's. Our enemies include our industrial system that has prejudice toward the employment of blind persons and other handicapped individuals. The use of strategic management implies that we must impact the basic systems that include our service delivery system, the governmental system, the Federal and State bureaucracies that direct programs, the political system, and the business and industrial systems of our country.

If we apply strategic management we must not just educate and inform those systems about our needs but must direct our efforts toward changing the systems. In examining strategic management in the strategic approach, we must first know the system. During the last year and a half, it has been quite an ordeal to "begin to learn the system of Federal levels." It is quite complex. If I had not had such dedicated staff as George Magers and others, I certainly know that I would not have survived. I can remember vividly when it turned



winter. My office was cold. I asked, "Why is this office cold?" I was told that it was the nature of that office. It has always been cold. It has been cold for the last 12 years. Well, I was puzzled, so I asked my secretary to get someone up to turn up the heat. A week later still nothing had happened, so I asked her what she had done. Apparently, the way the system works with GSA, one talks to it by telephone through a recorder. The recorder is part of the system. Whether anyone ever listens to it, I don't know. Finally I told my secretary after she had communicated several times with the recorder that there must be a better way. There must be something that can be done about this system. So, I asked her to put on the recorder that the low temperature was making me deathly sick and that I planned on filing charges. "Get somebody to turn up the heat." Well, when you threaten the bureaucracy it sometimes does move. Lo and behold someone came up and, believe it or not, it was warm the next day. But, the day after, it was cold. Well, puzzled again, I had her call the person back and I observed the repair being made. I said, "What are you doing?" He said, "I am cleaning out the trap." I said, "Well, is this going to be all right?" He said, "Oh! it will last about a day." I said, "Well, I will have to call you within another day." He said, "You are?" I said, "I will call you every day of your life, if you have to come up here personally and clean out that trap." I said, "What is it about the system that I cannot get any heat in my office?" He said, "Well, I can clean this out, but I am not an official plumber and I am not allowed to replace this part." Apparently, there has been a defective part for twelve years.

This is an amusing circumstance. However, there are certain aspects of the system that are not very amusing. The aspect, for example, of our universities, our training programs, our research people, not knowing the system of how to obtain grants is one of these. Since the system is constantly changing, one must keep abreast of these changes in order to deal with it.

One of the current roles of the Bureau is to assist people to understand the system. In addition to providing such assistance, I was recently appointed by the Commissioner to a committee to revise the grant system completely to assure a more open equitable system. A short time ago, John Maxson, Executive Director of the American Association of the Workers for the Blind, came to my office with a listing of people, including those involved with providing services for the blind, that will go on a registry. This registry will enable us to implement an independently-administered peer-review system in addition to the internal review system. This will force the peer-review system into a more objective modality. Many of you in the audience will have an opportunity to participate in the system. The challenge is that you must know the system. You must know the enemy you are dealing with.

Another aspect is that of designing a blueprint of attack. This is one of the most important responsibilities of the Bureau for Blind and Visually Handicapped. In working with organizations of

and for the blind, including the AAWB, we will work out a blueprint for action. Some areas of such a blueprint have already been delineated. The Randolph-Sheppard Act is a prime example of a blueprint for action using the strategic military management system. We are applying a variety of strategies to those governmental agencies whose activities have ramifications for visual impairment and the implementation of the Act. Ironically one of the agencies that has not implemented the Act is DOD. What we did rather than just have a bureaucratic talk in Washington when states were not given priority to open up vending facilities on military bases, was to provide a leadership and advocacy role in designing the strategy to be used. This design involves blind vendors going to their Congressmen and putting on political heat, including, in one case, a request to certain congressional leaders for a GAO audit of DOD and the U.S. Postal Service activities.

Another strategy that is being used is a stepped up request by state licensing agencies for arbitration to settle issues such as the ones mentioned. This is the kind of approach that our enemy understands--an approach that is invulnerable and hits them politically and logistically. This is what I address as a methodology to get things done in the 80's.

One of the current tragedies in our field is that we have some of the most advanced technology that could improve the capabilities of the visually impaired and blind people are wondering why it is not being applied for that purpose. I heard on the news last night that there are machines that read. Where are they? I think what we have done over the last two decades was to build the machines but not train people to use them. If RSA spends millions of dollars developing technology with no provision for training people how to use that technology and not one cent for the purchase of that technology for use by blind persons, I maintain the money for development is wasted. We have prepared a position paper on the area of technology from a systems approach. My feeling is that it should be, and must be the responsibility of all of us in the 80's to look for those weak links in the chain, to look at what is causing this problem, and take corrective action to implement this technology.

When we talk about a systems approach, another area of concern is the provision of services to clients. A major feature of the 1978 amendments to the Rehabilitation Act was to open doors in terms of the kinds of services now available to a client. No longer can a counselor say, "Well, we realize Mr. Jones that you needed some reader services when you were in law school and we provided them. But, now, even though you cannot carry out your law practice because you cannot afford a reader, we cannot help you." I think that such situations have been leaving extreme tragedies. I have personally seen money expended leaving one link missing in the chain. We can no longer have excuses for any missing links in services to blind persons. The legislation is sufficiently comprehensive and broad to alleviate the difficulties if it is implemented.



Another consideration in a systems approach for the 80's that the Bureau must continue to address is the interface with other agencies in connecting the links of the chain to form a total system. The first area that we have chosen to attack is that of deaf-blind individuals. We have currently worked out a relationship with the Bureau of Education for the Handicapped in which the BBVH, RSA and the BEH are jointly funding a project to determine the adequacy of the array of services from birth to death for deaf-blind persons. It might amaze you to learn that in all these years of services, we have never really examined the total picture. One reason is that it is an awesome task to cut across bureaucratic lines in the Federal government. In order to accomplish this, we had to intercede at the secretarial level. Despite the awesome problems in cutting across the bureaucracy, I don't think we can afford any longer not to do so.

A second major task we are implementing with deaf-blind individuals is that of jointly developing with BEH a registry of all deaf-blind persons in the nation. Such a joint effort will further assist in cutting across bureaucratic lines at the Federal level for the benefit of these clients. Thus, the aim of dealing with the problems of the total individual will be fostered. Further, the passage of legislation creating a new Department of Education with an Assistant Secretary for the Office of Special Education and Rehabilitative Services will facilitate the provision of services to the whole person from birth to death.

The next important mechanism we must employ in the 80's is program utilization. Some of you from fields other than services for the blind may recognize the importance of this mechanism. It is a term that is used in the allied health field and of which all of us must be aware and implement in the 80's. No longer can we afford to have two half-filled rehabilitation centers in a state with the two adjoining states planning to build two new edifices. We must identify a more reasonable concept of using what we have. Just as hospitals have had to develop a program of sharing rather than purchasing a full array of machines, I think we are going to have to examine concepts of sharing in the 80's considering the limited resources available.

One of the major aspects of program utilization during the 80's that will be promoted by the BBVH is the development of a new model of the Federal/state and private service delivery system. If we examine what has happened in the 60's and 70's when at times Federal and state dollars were plentiful, state agencies, in many cases, duplicated certain services because certain territorial issues were involved. Meanwhile private agencies were left somewhat out in the cold. I assure you as we look at the restrictions on Federal and state dollars that are likely in the future, we no longer can afford territorial conflicts. We must develop a total conceptual model to use all services to facilitate a true partnership in the service delivery system.

Another area of program utilization that must be considered is the client referral and intake level. I remember vividly, when

employed as a psychologist at a rehabilitation center, seeing many blind men and women who, two or three years after the onset of blindness, degenerated into staying home, using up their savings, and experiencing family problems. Finally, as a last resort, they came to the rehabilitation center. This situation is currently not so evident, but unfortunately, we still see too much. I think that we are going to have to examine strategies such as those used in the area of alcoholism. Historically, what we call a low bottom alcoholic was conceptualized in the area of alcoholism. The belief was that, in order for alcholoics to be rehabilitated, they had to hit the bottom, the gutter, and then they were ready for rehabilitation services. The situation was analogous to the way with which some blind persons are dealt currently. Some years ago a high bottom alcoholic program was established in which artificial crises were used to impinge on person's lives. The idea was to motivate them to seek the therapeutic systems. With such a program, a business concerned with positive management would say to Mr. Smith before he hit the gutter, "Look, we want to keep you on, and you must go for assistance. However, if you do not seek help we will have to fire you." We have to look at new positive approaches, especially for the many people who lose their sight in their 20's, 30's and 40's after they have developed their professional lives. We cannot afford to have them drop out for several years or to change direction radically. With our technology and methodology, we must get them into the rehabilitation process as soon as possible so that we can maximize their resources.

Finally, and, probably one of the most volatile areas in the field of blindness is what I would call quality control systems. I think that in the 80's, if we are to accomplish our goals, we must set up strategies and what we do must be of high quality. I think that the comments of Dr. Lowenfeld are true in that pathetic and inadequate services are worse than no services.

A matter in which the BBVH must be involved during the 80's is to set high priority in terms of high-quality services. This will require the development of a broad conceptual model concerning the whole area of quality control. Let me say that for the first six months on my job I believe I was naive enough to think that there was a simplistic quick and painless way that we could resolve the issue of standards. Well, I am here to say tonight I was quite naive. Hopefully the disappearance of my naivete and the process of talking to many people in an effort to understand the problem indepth will result in the development of an intermediate strategy that will reduce the kinds of conflicts that have drained off so much energy in this field. The stance that the BBVH is taking may be somewhat unpopular to all sides or to one side or the other, but we must take the stance that will assist us in carrying out our programs in the 80's with a minimum drain of energy.

With such a stance, we must first view the parameters from a broad perspective of quality control. This will involve an examination of a combination of all alternatives including accreditation, certification, and training. It is not reasonable to suggest that a carpenter can build a quality house with only one tool. It takes



a number of tools. It is also inaccurate to suggest the carpenter cannot build a house without a saw or hammer or another specific tool.

We have already taken one important stance that was proposed at the meeting of the National Council of State Agencies for the Blind. The stance essentially is that there must be program standards and there must be standards for professionals. No matter how you cut it, if you do not have, for example, certification or accreditation, it will occur anyway. Wherever a supervisor or administrator for example hires a mobility instructor or some other professional, he/she will use his/her standards. So, inevitably some standard is used. The initial stance that the Bureau has taken is that with state agencies a criterion will be established by which the standards that the states develop will be evaluated. The state will have an alternative of going for the accreditation process with NAC or of developing its own standards. Standards developed by the state must meet the basic criterion of all standards in that certain evaluations must be external. As an example, we must look at improving and upgrading certification. I have gone on record of moving in the direction of competency-based certification. The concept there is not a onetime certification in this changing world since skills must be updated. It is a real challenge to AAWB to look at its area of certification which is one of the tools for quality services. As far as I am concerned, all these tools are important and valid. I do not promote the idea of Federal dollars being attached to any one of them. I think that the freedom of alternatives is important. On the other hand, I would like to indicate clearly that the issue of improving existing standards is an important one. The issue whereby the grant system historically has been used in this area is somewhat a political ballgame and must come to an end. I have recommended, and it has been executed by the Commissioner of RSA, that peer review will be used in the grant system. If NAC or anyone else wishes to come in for grants to improve the quality of standards they have the right to open competition, and to apply for a grant. I want to emphasize that there is no perfect system. However, I do believe that taking the issue of quality control as much as possible out of the political arena and putting it in the professional arena where outside professionals evaluate a grant process set up by HEW will reduce some of our problems. But, it certainly will not resolve all of them.

Quality control will continue to be an issue in the 80's. Hopefully, the use of certain strategies that I have described will reduce the drain of energy that has been occurring. I think the BBVH will assist this family and all organizations of and for blind persons in doing what we know should be done in the 80's.

## A PHYSICIAN'S VIEW OF PREVENTION OF BLINDNESS AND RESTORATION OF VISION IN THE DECADE AHEAD

*Whereas the first two articles in this Annual deal with the development and implementation of legislation related to services for the visually impaired, this deals with the application of medical techniques to prevent the loss of vision and restore it where possible. Obviously, relevant legislation is necessary to increase the availability of medical services.*

*Dr. Thompson, National Consultant to the Canadian National Institute for the Blind, assesses some of the expertise now available but not optimally exploited, and indicates some of the crucial needs to which the attention of medicine needs to be directed. His article certainly indicates cautious optimism for prevention of some types of blindness and restoration of vision in others.*

### PREVENTION OF BLINDNESS AND RESTORATION OF VISION IN THE 1980'S

by

G. A. Thompson, M.D., F.R.C.S.(C), National Consultant  
Canadian National Institute for the Blind

Before discussing the prevention of blindness, it is necessary to establish a working definition for the condition. Most countries that are concerned with active prevention have a legal or official statement based on visual acuity and/or visual field measurement. In Canada blindness is defined in the Blind Persons Act, July 25, 1962, as follows:

"A person is considered 'blind' if the visual acuity in both eyes with proper refractive lenses is 20/200 (6/60) or less with Snellen chart or equivalent, or if the greatest diameter of the field of vision is less than twenty degrees."

## Causes of Blindness

Seeing is a complicated function involving the eyes, optic nerves and brain with many blood vessels, nerves and small muscles playing essential supportive roles. Since any of these component parts may be malformed at birth, or if normal, may be upset by many factors, it can be seen that there are many different causes of blindness.

In Canada we are fortunate in having a nationwide agency--the Canadian National Institute for the Blind--that has, among its many functions, the compilation of statistics. These are published yearly in a small pamphlet entitled Statistical Studies on the Blind Population of Canada Registered with CNIB. In a monumental work published in the Canadian Medical Association Journal, MacDonald (1965) studied the records of 24,605 people registered with the CNIB, analyzed the causes of blindness in Canada and classified them according to site, type and aetiology. Table 1 summarizes his findings

Table 1

| Cause               | Approximate Percentage |
|---------------------|------------------------|
| Corneal Disease     | 6                      |
| Glaucoma            | 10                     |
| Optic Nerve Disease | 11                     |
| Cataract            | 16                     |
| Retinal Pathology   | 23                     |

He found that trauma was a factor in about 5% of cases, infectious diseases in about 12%, and prenatal causes in about 32%. The incidence of blindness in Canada was 131 per 100,000 population.

In 1978, there were 2,515 persons registered as blind with the CNIB. This does not represent the total number of people who became blind that year, since many more did not want to be registered for many different reasons. It is interesting to compare figures from this 1978 report that appear in Table 2 with those for 1965.

Retinal pathology includes retinal detachment 1.3%, diabetic retinopathy 10.2% and macular degeneration 34.8%.



Table 2

| Cause               | Approximate<br>Percentage |
|---------------------|---------------------------|
| Corneal Disease     | 2.3                       |
| Glaucoma            | 7.9                       |
| Optic Nerve Disease | 5.8                       |
| Cataract            | 5.0                       |
| Retinal Pathology   | 46.3                      |

In 1978 a total of 32,308 persons registered with CNIB, an incidence of 138 per 100,000 population, somewhat higher than the 1965 figure.

#### Prevention of Blindness

History shows that the incidence of certain types of blindness can be greatly reduced. For example, about 100 years ago, ophthalmia neonatorum due to gonorrhea was responsible in some countries for up to 45% of the blindness. With the use of silver nitrate solution in the eyes of the newborn within the first hour after birth, this type of corneal blindness has all but disappeared. The discovery of sulphonamides, penicillin and other antibiotics effective against the responsible organism have helped to control the infection in the adult, and thus reduce the chance of involving the eyes of the baby.

Unfortunately, the incidence of gonorrhea has recently shown an alarming increase and we could expect an accompanying increase in ophthalmia neonatorum. Obstetricians must be on the alert for infection in the pregnant patient, performing bacteriological tests and administering treatment prior to delivery where indicated. The delivery room staff must be diligent in the use of silver nitrate solution in every newborn baby, Lewin (1978). The widespread use of anti-pregnancy medications may be a blessing in disguise in this regard.

## Plans of Attack

### Study of Statistics

A study of blindness statistics may reveal areas in which study can be fruitful. For example, in the past it was noticed that many workers suffered serious eye injuries on the job. Management, labour, workmen's compensation boards and safety associations studied working places and made recommendations about safety measures. As a result, various types of safety devices were manufactured and provided to the workers with a considerable reduction in the number of serious eye injuries. Examples are regularly shown in the Wise Owl News.

Placement throughout working places of personnel specially trained in safety measures has been a positive step forward and has been effective in minimizing dangerous situations. Prompt emergency measures often reduce the severity of an injury, e.g. irrigation of an eye after a splash of an alkali or other chemical. Such measures make the condition more amenable to definitive treatment when the injured worker can be taken to the doctor's office or the hospital emergency department.

About 25-30 years ago, there was a rather high incidence of induced blindness in premature babies. Many suggestions were made as to its aetiology, but in the early 1950's it was shown that the condition--retrolental fibroplasia or the retinopathy of prematurity--was really caused by the well-intentioned attempts to assist the respiration of premature babies by keeping them in incubators with a high concentration of oxygen. Once this association was accepted and the oxygen concentration lowered, there was a dramatic drop in the number of affected babies. Since the condition is still appearing, even in full term infants, we haven't learned the whole truth yet.

From time to time, babies in a single area of the country are found to have cataracts, either at birth or soon after, associated with deafness, heart trouble and many other abnormalities. When the obstetricians, paediatricians, ophthalmologists and public-health people discovered this phenomenon and put their collective heads together, they finally learned that the mothers of the affected babies had rubella (German measles) early in pregnancy. It was also found that other women who at the same time delivered normal babies had the German measles some time prior to their pregnancy, thus developing an immunity against the disease. Since the discovery, the virus of rubella has been isolated in the lens of the cataractous baby for many months or years after birth, indicating that the nonimmune mother had infected the baby with sometimes disastrous results. It would seem obvious that the congenital rubella syndrome could be eliminated by making sure all young females develop rubella before they reach the child-bearing age. If any escape, they should be inoculated to develop permanent immunity and thereby protect any

future children from being born with the syndrome which can be severe enough to be lethal. On a more positive note, innoculating children against rubella at the age of 15 months is becoming a common practice in many regions of Canada and the United States. Such practice, if adopted universally should eliminate the congenital rubella syndrome.

### Surveys and Screenings

Instead of waiting for blindness to appear unannounced, we must be aggressive in searching for conditions that may lead to blindness if neglected or not treated in time. It is a sad situation to have a 6 or 7 year old referred by a school nurse because she found the vision poor in one eye. Examination usually reveals amblyopia (lazy eye) and at that time of life little if anything can be done to restore normal vision. Obviously, the parents had been unaware that the child had poor vision in the one eye, simply because the good eye enabled him to appear to function normally.

To help such children, treatment must be started as soon as possible. And, to locate them, parents are urged to take their children to be screened for amblyopia, strabismus (turned eye) and other abnormalities. Even if these children haven't learned to read, with training and practice their vision can be measured and their eyes can be examined. Amblyopia occurs in about 2% of children and thus it is a frequent problem. Early treatment can restore good vision in a large number of children who then will go through life without the threat of becoming blind if something happens to the other eye.

Recently a new type of treatment has been developed in England that is claimed to be effective in improving vision in those with amblyopia even when it is discovered later in life. These findings have not been widely replicated and further work will be necessary to substantiate them. The best plan of attack still is the discovery of the lazy eye around the age of 2 or 3 years and the institution of treatment immediately. Treatment includes spectacles, patching, drops and, in some cases, surgery to correct strabismus or to remove congenital cataract. Early correction of the turn can result in the restoration or maintenance of good vision. It can also have psychological benefits because the eyes are straightened before the child mixes with other children who can be quite blunt and unkind with another who is different.

Both amblyopia and strabismus may be indicative of other more serious conditions, such as congenital cataract or a tumour, either in the eye or the brain. They must never be taken lightly. Parents of young children must be made aware of the potential danger accompanying these two conditions and be strongly advised to take any affected child for medical examination immediately.

Another type of screening is for the presence of glaucoma. Glaucoma may be present for many years without any symptoms of pain,



discomfort or apparent changes in vision. Although the incidence of glaucoma is not high--approximately 1% in people over 40 years of age--nevertheless, the end result of untreated glaucoma--blindness--makes it a most dangerous condition and justifies every effort to find it early before any damage has been done. It may be noted that with the increase in longevity, this percentage may be expected to rise.

Screening for glaucoma can be either passive or active. Passive may be carried out in the private office and hospital clinics as a part of the examination of every patient. This obviously depends on the patient presenting himself voluntarily for examination. The active screening takes place in other locations when the examiner takes the necessary equipment out into the community. Any person who is found to have suspicious symptoms is then referred for more extensive examination and investigation, since screening is only a superficial search.

It is worthwhile to examine the family members of children with amblyopia and of people with glaucoma because these conditions have a higher incidence in these families than in the general public. If a family's first child is found to have amblyopia, it is not surprising to find one of the parents with a lazy eye. They should be alerted to the possibility of future children being similarly affected.

Pierce (1978) has indicated that approximately 50% of the blind population under the age of 20 are visually handicapped because of some form of inherited disease. We can put this in another way--50% of the blindness found in the under 20 age group, being inherited, might have been prevented had the parents received genetic counselling. The genetic ophthalmologist, still in short supply, is becoming more and more important in the prevention of blindness. The affected person is examined to establish a firm and accurate diagnosis, and the family pedigree is identified with examinations of other members when necessary. The person is then told about the type of inheritance pattern present in the family and the chances of future offspring being affected. The genetic background of the spouse must, of course, also be studied and integrated with that of the affected person.

Effective genetic counselling is preventive medicine. It succeeds when a family elects not to have further children because of high odds with heavy burden. It succeeds when a family, reassured that the expected risk is low and the burden light, elects to have children. It is essential that genetic counselling should be available to those who wish it. In fact, we should seek out and inform those who should be told. The tragedy of even one case of inherited childhood blindness that might have been prevented had the parents been aware of the genetic risk, is too high a price for our failure to inform. We must increase the supply of genetic ophthalmologists as quickly as possible so that this service will be more readily available to more people with inherited childhood blindness. Workers with the blind must, in turn, encourage them to avail themselves of this counselling and to consider the information most seriously.

## Sports

Sports can be marred by serious injuries that can lead to blindness or even the loss of one or both eyes. Fortunately, usually only one eye is involved but this leaves the person in the position of having one good eye and being in jeopardy should something happen to it. For many years, eye injuries were considered unfortunate incidents but during the past decade greater attention has been directed to this problem. In Canada, largely through the interest and efforts of Pashby (1974, 1975), Chairman of the Canadian Ophthalmological Society's Committee to Investigate Eye Injuries in Hockey, the problem was studied and assessed and firm recommendations regarding safety measures were made to the governing bodies of Canadian hockey. Ongoing studies have shown a 50% reduction in eye injuries in players 11 years of age, largely because of the use of helmets and approved face guards. It is evident that the older players have not always agreed to wear the protective gear from the figures that show an increase in the number of injuries. Their studies show that about 8% of all hockey injuries involve the eye and that one in six injured eyes becomes legally blind. A third of the legally-blind eyes were found in boys 15 and younger.

The incidence of amblyopia, (2-4%) naturally causes a great deal of concern in the hockey world since an injury to the normal eye would be tragic. Thus the Committee strongly recommends that the wearing of an eye protector should be mandatory for any player with an amblyopic eye.

Hockey is not the only sport that poses a threat to the eye. The racquet games, because of the speed of the ball or bird and the nature of the sport, have been responsible for eye injuries. Easterbrook (1978) reported 23 squash injuries in his own experience over a 2½ year period, of which 11 required hospitalization and 5 had some loss of vision. No eye was rendered legally blind nor was it necessary to remove one. He makes a strong plea for players to wear protective eye guards and for squash clubs to have guards readily available. He believes that these injuries are totally preventable.

## Cooperative Efforts

Mention has already been made of the virtual elimination of ophthalmia neonatorum, retrolental fibroplasia and the congenital rubella syndrome as common causes of blindness through the cooperation among various professionals. Presently, intensive study is being carried out in many centres on the multiple problems of diabetes mellitus using the combined expertise of a host of disciplines including biochemists, laboratory researchers, endocrinologists and ophthalmologists, to mention a few.

In 1965, MacDonald found the incidence of diabetic blindness to be 5%. In 1978, it had risen to 11.8% of which about 86% was due to diabetic retinopathy. This is a large increase in just 12 years. We know that diabetics have been living much longer since the discovery of insulin in 1922, and we have also found the incidence of retinal changes in diabetics increases with the length of time the disease has been present. Undoubtedly, many other factors are at work and many questions have to be answered. What is the basic cause of diabetes? Why do some people develop the disease and others do not? Why do some diabetics never show retinal changes? Does a person become a diabetic because the insulin they produce is abnormal? Do they have normal insulin but produce some other substance that interferes with its action? We look to the research team to find answers to these questions.

Just as Banting and Best discovered a treatment for diabetes, we may hope that present and future research workers will find a cure and thus eliminate diabetic blindness.

### Future Considerations

What of the future? A study of the statistics for the past 10 years reveals that retinitis pigmentosa has been responsible for 3.8% of the newly-registered blind Canadians. Over the past several years, intensive coordinated research has been carried out in many centres involving many branches of medicine to find the abnormality responsible for the relentlessly progressive condition. Already it has been found that there are various genetic patterns involved and further studies must be carried out so that more information will become available for better genetic counselling. Under the International Association of Retinitis Pigmentosa Societies and with the financial aid of each, this research will be intensified. A registry of affected eyes has been established so that microscopic study can be carried out on these eyes. There is intense interest in hormones and trace metals related to visual pigment and retinal protein metabolism. Suspicion is being directed to one or more enzymes in the metabolism of the retina. The use of laboratory animals has been helpful in supplying relevant information.

It is hoped that this type of basic research during the next decade will uncover factors responsible for retinitis pigmentosa. A cure has not been found but progress is being made.

As mentioned previously, glaucoma is a serious condition and in spite of improvements in medical and surgical treatment in the past, it was still responsible for 7.9% of the blind registered with the CNIB in 1978. Research must be directed to the basic causes with particular emphasis on the intimate details of the physiology of the optic nerve, including the effect of arterial hypertension and diabetes on the small blood vessels that nourish it. Since early diagnosis and prompt initiation of treatment is usually effective in



controlling the condition and preventing blindness, screening must be more rigorously expanded. Having located people under suspicion, better, more sensitive testing methods must be devised for earlier, more accurate diagnosis. The accompanying risk factors, including family history, patient's age, condition of fellow eye, and the intraocular pressure variations, to mention a few, need to be studied and expanded (Drance 1977). Newer pharmaceutical agents with longer action and more potent pressure lowering ability, but with fewer side effects, should be developed for better effect and greater patient compliance.

The eye can be attacked by bacteria, fungi, viruses and other parasites, often with disastrous destruction. It is important to diagnose the trouble early, locate and identify the offending agent, then use the appropriate therapy as soon as possible, because the eye can be quickly damaged or even destroyed. Unfortunately, it is not always easy to identify the cause of the trouble with the means at our disposal and thus we must develop more sensitive clinical and laboratory tests for this purpose. Sometimes, even when a proper identification is made, no therapeutic substance is available. So, we must call upon the pharmaceutical industry to produce medicines that will not only be effective in dealing with the problem, but will also be safe to use. An example is eye diseases caused by herpes simplex virus--the virus of the common cold and the cold sore. This virus is prevalent in the world and causes a great deal of misery and economic loss through the involvement of the nose and throat. It may affect the eye. If we are lucky, only a small ulcer will develop that will be cured by chemical cauterization or by the use of antiviral agents produced by the pharmaceutical industry. Sometimes however, the virus becomes firmly entrenched and no medication at our disposal is effective in preventing the resultant chronic recurrent disease that, through scarring, blurs the vision in the eyes to a point of blindness. Surgery may not always be effective. We urgently need newer therapeutic agents to deal with this most distressing condition.

The eye may be involved in different ways with some general body diseases of unknown origin. Arthritis and multiple sclerosis are two such conditions. Close liaison with those in other branches of medicine such as the rheumatologist and neurologist may, in the future, throw light on these serious little understood conditions.

Aggressive expansion of screenings and surveys must be carried out. The medical profession must be on the alert for eye conditions that can result in blindness and initiate appropriate treatment or make the necessary referrals. Mobile eye care units must continue to take quality eye care to the neglected population in the isolated areas of the country. In the past, the Ontario Mobile Eye Care Unit, manned by ophthalmologists, found that up to 70% of the people examined had some abnormality that needed correction or treatment. The pre-school screening programmes should be expanded by training more volunteers in more school areas so that the conditions that lead to blindness may be found in time to start preventive measures. A single

visit to an area is not enough, plans must be made for regular return trips because a person who is pronounced normal on one occasion may not be in the near future. This can certainly apply in glaucoma.

The study of risks in home, school, industry and sports must continue and be expanded to keep up with newer manufacturing processes and products, with appropriate modification of present safety equipment and introduction of new appliances. People at risk should be constantly reminded of the dangers and urged to use the available protective goggles, shields and other equipment as well as foresight and common sense. Steps should be taken to present courses on eye safety in all schools, not only to students but also to parents and teachers as well.

One of the common complaints made by workers about safety glasses and goggles is "they fog up and are uncomfortable." The optical manufacturers should be asked to design more comfortable, but equally effective appliances so that there will be better compliance in wearing them in risk situations. The manufacturers should also continue to strive for better and safer lenses for ordinary spectacles as well.

We can develop the optimal system of blindness prevention but unless we can get it across to the audiences, it will be worthless. There are many audiences we want to reach and each one must have the message tailored to suit the parameters with which it is involved. The medical profession, including ophthalmologists, is a very important group since it is in a position to influence a large portion of the population. Nurses and teachers are similarly situated as they come in contact with a large segment of society, especially the young in the care of teachers. We can present the message to the audiences in different ways including personal appearances and through print, radio and television. It is important to seek the advice of the public relations professional and to use his/her expertise in the presentation of these programmes.

Special mention will be made of two conditions that are high on the list of causes of blindness in the world--macular degeneration and cataracts.

#### Macular Degeneration

In 1965 MacDonald reported macular degeneration to be the cause of approximately 5% of the cases of blindness. In 1978, we found that incidence to be about 35%--the largest single cause of blindness in Canada. During the year 1969, the ophthalmologists in Canada were encouraged to inform us about their patients whose best vision was 20/200 or lower, so that they might become eligible for all the services provided by the CNIB. Since then we have seen the increase in numbers of persons in that category. We noticed that with a few exceptions, all cases occurred in the 50 and over age group

with an aetiology variously stated as old age, senescence, or involuntary changes--in other words, part of the penalty of getting older. Other related diagnoses such as choroidal sclerosis and retinal arteriosclerosis further support the aetiology.

What steps can be taken to prevent this type of blindness? Paetkau et al. (1978), suggest smoking might be a factor in certain types of macular degeneration and recommend that stopping might prevent its onset, or at least postpone it. The discipline of geriatric medicine with its accompanying research into the changes of senescence might reveal biochemical, enzymatic or toxic processes that can be prevented, arrested or reversed with resultant prolongation and preservation of sight. Not all people over 70 years of age suffer from macular degeneration, and a study of these people in order to compare them with their affected contemporaries might supply some answers.

### Cataract

Sir John Wilson (1975), stated that one of the major causes of blindness is cataracts. In India alone, there were at that time 4 million people who had cataracts and were blind because of the shortage of cataract surgeons. He estimated that if all the ophthalmologists in North America and Europe went to India, it would take them 3 years doing nothing but cataract operations to clear up this backlog.

In a large percentage of people who are blind from cataracts, vision can be restored by an operation to remove them (see below), but we are still faced with the question, "What causes cataracts?" In a few cases we can find a cause--injury, ocular disease, a systemic metabolic disorder, genetic influence--but in the majority of cases the cause is still unknown, except that it is accepted as being part of the aging process.

Should we continue to accept the diagnosis, senile cataract, or should we look further, as with macular degeneration, into various general conditions. There must be some unknown influence since not all people develop cataracts in their later years. As with macular degeneration, we look to the geriatric research team for answers.

### Restoration of Vision

As we have seen, certain types of blindness are largely preventable such as that caused by injuries and glaucoma. Other types are untreatable and nonreversible. There are still others, however, in which vision can be restored and the person returned to personal, social and economic independence.



## Cataract

The first example is cataract. In the Western World the cataract extraction is the most common eye operation in the over 60 population and vision is improved or even brought to normal level in 96% of the cases, Stallard (1965). Usually by itself, the operation will not bring good vision since some sort of optical correction is required. Spectacles with a strong (aphakic) lens, hard or soft contact lenses, extended wear contact lens, and the intraocular lens are all used with varying degrees of success, satisfaction, comfort and safety. The optical industry has given us improvements in these in the past and in the future we can look for spectacle lenses with wider fields of vision and less distortion, contact lenses of improved, safer materials with higher gas permeability and corneal acceptance, and intraocular lenses of improved, safer design.

## Vitreous

The vitreous humor is an inert liquid body that, except for degenerative changes, is not in itself a primary cause of blindness. However, as a result of direct trauma or changes secondary to retinal or vascular abnormalities, the resulting opacification can be a major contributor to blindness. Historically, about 25 years ago, attempts were made to aspirate the vitreous and replace it with donor material, but this was largely discarded because of inconsistent results. Because of fibrous tissue attachments between the vitreous and the underlying retina, attempts at simple aspiration often produced complications by causing detachment of the retina if not already present, or aggravating it if present. A great advance was made by Machemer et al. (1971) who reported the development of a vitreous infusion suction cutter machine, the vitreous "gobbler," which, with a sharp cutting end, separates vitreous bands and scar tissue, aspirates and replaces the removed vitreous with solution all at the same time. Through its action, the vitreo-retinal surgeon is able to see the retina, find any pathology and deal with it under direct observation. This type of instrument increases the chances for restoration of some vision in this type of blindness.

As mentioned above, vitreous opacification is closely related to retinal troubles and diabetes is the major cause of retinal pathology. Retinal detachment has been a considerable contributor to the ranks of the blind and treatment has been effective in restoring vision in an increasing proportion of affected people as newer ideas and techniques have been developed.

Since Gonin (1918) first identified the significance of retinal holes and tears in the formation of a retinal detachment and the necessity of closing the break to return the retina to its proper place, the treatment has been more successful. He recommended using electric burns for this purpose. Meyer-Schwickerath (1954) first

applied a beam of concentrated light to the retina and since then, different sources of light have been developed. More recently the Laser beam has been deployed in some circumstances. All these techniques work by generating heat, thereby sealing the retinal hole and reattaching the detached retina to its bed by scarring. The same effect can be gained through the use of instruments with intensely cold tips. Different, more sophisticated surgical procedures have been developed so that the results of retinal surgery have shown a steady improvement. Improvements in examination techniques and equipment in the future will give higher magnification of the retinal changes for easier localization and more accurate control of treatment decision and delivery. This will be most important in handling proliferative diabetic retinopathy.

Another important concept that will be used more in the future is the controlled study of newer treatments in several centres simultaneously and comparisons of the pooled results with those of older treatments. This has been done in the past, sometimes with positive results and the new treatment is then incorporated into the doctors' therapeutic armamentarium. If the results are negative, the treatment is discarded or modified for further study.

More blind eyes must be obtained for study in the laboratory. Mention was made previously of the registry of retinitis pigmentosa eyes and this registry should be expanded to include eyes with other blinding conditions. These can be studied with newer, stronger microscopes; and cells can be grown in tissue culture and examined for abnormal chemical and enzyme concentrations. Also, special studies might identify abnormal chromosomes and genes.

### Corneal Transplantation

Corneal conditions were responsible for about 2% of blindness reported in Canada in 1978. Some of these certainly could have been prevented, for example, those resulting from trauma, and burns. For every person registered because of corneal blindness, there are many who do not become "statistics" since vision has been restored by a corneal transplant operation. Also, there are others who have had only one eye affected and hence are not registered.

Early in the transplantation era, results were less than satisfactory. Infections developed, healing was problematic, tissue rejection was common and glaucoma appeared in convalescence. Because of the discovery and manufacture of effective and non-toxic agents, infection is now a minor problem. Healing has improved through the design of better and finer instruments, the development of more inert suture material, and better magnification. Better anaesthesia has been an important factor in more uniform results. With better surgical techniques and improved healing, the incidence of glaucoma has been greatly reduced. The other factor mentioned above--tissue rejection--although reduced in frequency, has not been eliminated. In the future this problem will be studied even more intensively.

Renewed interest in tissue typing--matching compatible donor and recipient--will increase, especially in patients in the high risk group. Research in the immunology of tissue rejection will be broadened and hopefully, newer agents will be found to prevent and overcome the problem.

In the past, much attention has been directed to the condition of the host eye, surgical techniques and the prevention of infection. In the future, more emphasis will be placed on the condition of the donor material. More details concerning the cause of death of the donor and medications given immediately prior to death will be obtained. Using tissue culture techniques, various commonly used drugs will be added to the growing corneal cells and any changes will be studied. This can be of great importance because some of the best donor eyes are received from young, healthy adults who die from an overdose of drugs. Measurements will be made of the concentration of the particular drug in the corneal tissue and its effects on the health and structure of the individual cell will be investigated. From these results, we will be better able to predict chances of a successful operation.

One of the main problems facing the corneal surgeon and the Eye Bank is having the perfect eye at the right time. Since a donor eye will remain "fresh" for only a relatively short time--a day or so--methods of preservation must be developed that will give the surgeon a better chance of receiving a good eye when he needs it.

Certain types of corneal conditions are not suitable for the usual operation using human donor tissue. These operations invariably show tissue rejection and thus vision is not improved. Attempts at transplanting synthetic materials have been carried out for many years with some temporary success. Research will continue for better, more acceptable implants.

In conclusion, prevention of blindness can be achieved at various levels. The individual can succeed by applying foresight and common sense and by using available protective appliances. Groups, through study, can identify threatening situations and activities and can plan ways to avoid injuries that can lead to blindness.

Finally, medical personnel and other scientists, working together, can attack the mysteries of disease and degeneration and the problems of heredity and environment.



## References

- Drance, S. Chronic Open Angle Glaucoma--Present and Future. Canadian Journal of Ophthalmology. 12 (October, 1977), 251-258.
- Easterbrook, M. C.M.A. Journal 118. (1979) 298-305.
- Gonin in Duke Elder. System of Ophthalmology. Volume X. London: Henry Kingston, 1967, p. 774.
- Lewin, P. K. C.M.A. Journal. Volume 119 (July 22, 1978), 120.
- MacDonald, A. E. C.M.A. Journal. Volume 92 (February 6, 1965), 264-279.
- Machemer, et al. Vitrectomy: A Pars Plana Approach. Trans. American Academy. Ophthalmology Otolaryng. July-August, 1971, 75, 813-820.
- Meyer-Schwickerath. Light Co-agulation. V. Graefe's Arch. Ophthal. 1954. 156, 2.
- Pashby, et al. C.M.A. Journal. Volume 111 (1974), 501.
- Pashby, et al. C.M.A. Journal. Volume 113 (1975), 663-666.
- Paetkau, et al. Canadian Journal of Ophthalmology 13. (July, 1978), 135-138.
- Pearce. Editorial. Genetics in Ophthalmology, Canadian Journal of Ophthalmology 13. (July 1978), 135-138.
- Stallard, H. B. Eye Surgery. Bristol. John Wright, 1965. 603.
- Wilson, Sir J. Meeting to discuss Canada's participation in National and International Prevention of Blindness Activities. Toronto, April 2nd. 1975.

## NEW APPROACHES TO LOW VISION SERVICES

*Until recently nearly all those with visual impairments were commonly "lumped together" as being blind. Those who had residual vision were left to shift for themselves in the hope that "they would get along," and little consideration was given to exploiting their reduced visual capacities and rendering them productive members of society. As a result, many behaved as though they had no light perception. But, in the last two decades the application of electronic technologies to the problems of low vision have made it possible to extend greatly the capabilities of those with these impairments. Yet, the possibilities have not always matured into consummation because of the lack of skilled personnel and funds to provide needed training and hardware to clients.*

*In this article Quillman and Goodrich analyze many of the key issues concerning the provision of low vision services and make recommendations for extending low vision services to the visually impaired population, thus reducing their dependency.*

### LOW VISION ENTERING THE 1980'S

by

Robert D. Quillman, Chief  
Visual Skills Section

and

Gregory L. Goodrich  
Research Psychologist

Western Blind Rehabilitation Center  
Veterans Administration Medical Center  
Palo Alto, California 94304

### Introduction

The term "low vision," admittedly of recent origin, has rarely been given a precise definition. In fact, when definitions have been made, there have been differences among them. Blindness has been known

to exist for thousands of years. References to blind people in the time of Christ can be found in the Bible. Some of these people had usable vision, but the distinction between total blindness and reduced levels of vision was not made. Historically the blind, like many minority groups, have been stereotyped and shunted aside. Within the blind population the low vision person has been ignored. Even in the "enlightened" periods of history the valid distinction between partial loss of sight and total loss of sight has not been made.

Except for a few notable individuals and agencies, only within the last 10 to 15 years has the rehabilitation field recognized the need to differentiate low vision from blindness. Low vision is, in many respects, similar to blindness, but this does not obviate the need for unique aids, services and opportunities for the low vision client. Once the distinction was recognized the development of many necessary aids, services and opportunities occurred rapidly. Today the American Association of Workers for the Blind has a low vision interest group, university programs offer courses in low vision, various disciplines offer continuing education courses, and over 150 low vision clinics are listed in the American Foundation for the Blind's Directory of Low Vision Services. The state of the art in low vision has never been better, yet it is precisely now that we should recall Murphy's 90-90 Law of Project Schedules:

The first 90% of any project takes 90% of the time, the remaining 10% takes the other 90% of the time.

#### A Workable Definition

What is low vision? Legally, low vision is the same as blindness (e.g., best corrected visual acuity of 20/200 in the better eye and/or a visual field subtending no more than 20 degrees in the better eye). In practice the definition may be applied to anyone who is legally blind but who has some usable vision. It may also be applied by some to be anyone with a best corrected visual acuity of 20/70 or less. Another functional definition might include those who have difficulty performing a task visually that they wish to carry out.

Whichever definition is used, and the above is not an exhaustive list, it is evident that the problems resulting from any visual deficit will vary from one person to another. An accountant with 20/100 visual acuity may have a condition that threatens his/her job. A janitor with 20/100 visual acuity may have an annoying, but tolerable, loss of vision. The most acceptable definition therefore seems to be that presented by Mehr and Freid (1):

Low vision, partial sight, or subnormal vision may be defined as reduced central acuity or visual field loss which even with the best optical correction provided by regular lenses still results in visual impairment from a performance standpoint.



This paper will provide a model of low vision services and an overview of the field of low vision, in particular identifying some areas of strength and weakness within the profession. Even in its short history, the field of low vision has become too extensive to encompass in a single paper. Thus we will emphasize only the major points.

### Low Vision Services

The progression of a person through a low vision program varies from area to area, state to state, and organization to organization. Many factors contribute to this variability, with some of the most common being:

1. the lack of trained professionals to adequately evaluate client needs;
2. the lack of trained professionals to ensure that all steps in the low vision program are followed;
3. the lack of trained optometric/ophthalmological low vision specialists to prescribe aids;
4. the lack of trained support personnel to provide instruction and training with aids;
5. and finally, insufficient funding to provide adequately the minimal necessary low vision care.

Each agency must have some degree of flexibility in the administration and organization of its low vision program. However, each agency must ensure that certain minimum requirements are met, otherwise the services provided under the name of low vision may be more harmful than helpful to the client. Figure 1 on page 39 is a schematic diagram of the minimal steps necessary in a low vision rehabilitation program.

The first two stages, referral and medical, are interchangeable; that is, the physician may be the referral source, or a private party or an agency may refer a low vision patient to the physician. In either case it is an essential prerequisite that the low vision client receive a thorough medical evaluation prior to receiving low vision services. The ophthalmological examination should include diagnosis, recommendations for necessary medical/surgical treatment, and prognosis. This will ensure that the client's condition is as stable as possible and that any necessary medical precautions can be taken during low vision rehabilitation. Optimally the physician will, if not qualified in low vision, refer the patient to the low vision clinic and provide feedback to the referral source concerning the case and its disposition.

When the referral and medical stages have been completed, the low vision examination should be conducted by an optometrist or

FIGURE 1

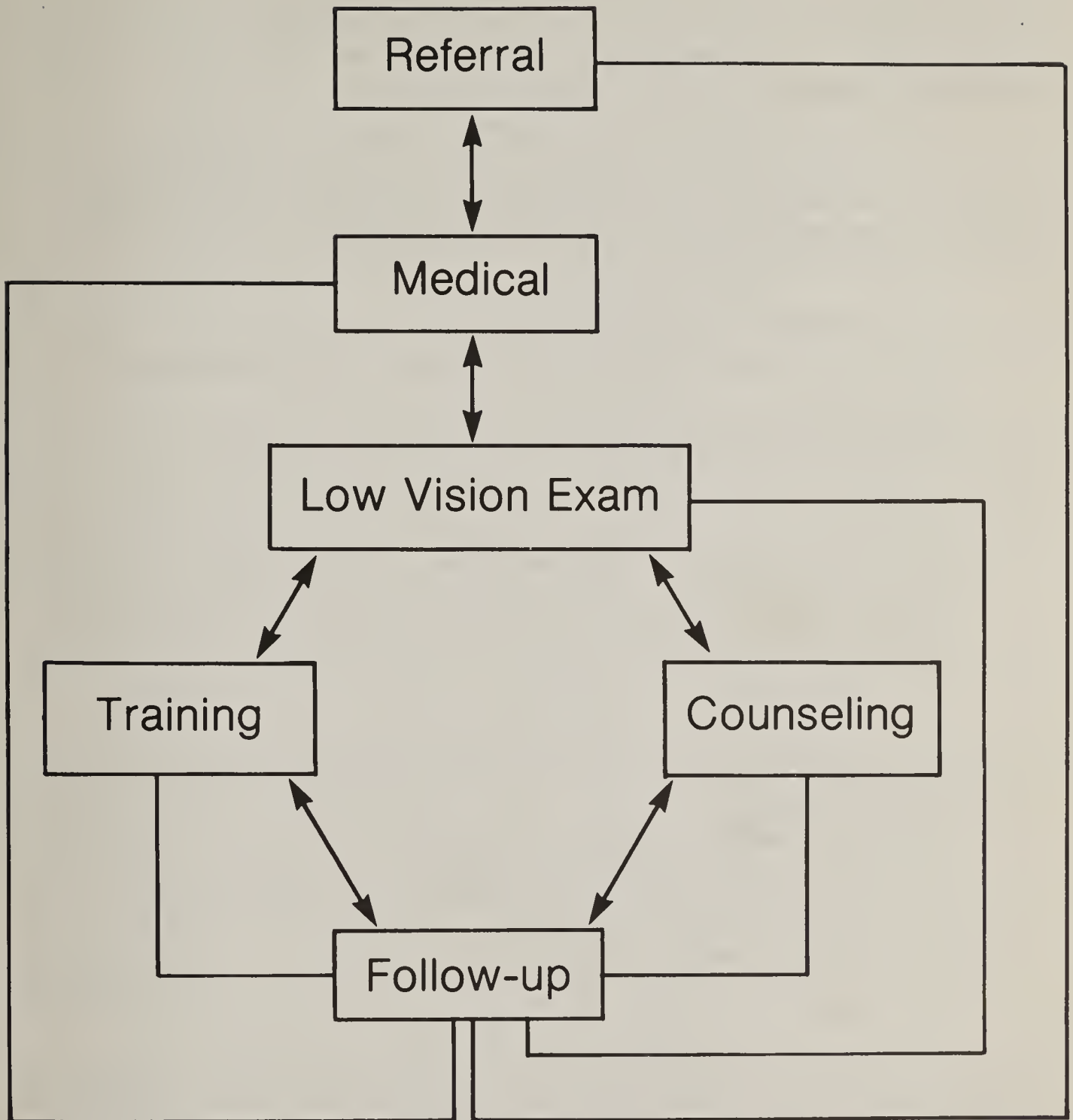


Figure 1.--Model of low vision service delivery system. Progression of client (student) through the system from referral to follow-up is shown by the double arrows. These arrows indicate the need for direct communication between adjacent areas within the model. The need for extended communication and the possibility of repeated visits by the client for low vision services is indicated by the solid outer lines.

ophthalmologist skilled in the area of low vision. This stage will also include the evaluation or assessment of the client. The outcome of the evaluation and low vision examination will be a tentative prescription. This will include the prescription of a low vision aid and an outline of a program of instruction and training. Depending upon the outcome of the training, which is best measured by observation of the patient's performance, the prescription may be either finalized or modified to provide better visual functioning.

The training phase of the low vision rehabilitation process will follow the low vision examination. In the past, the area of training in the use of residual vision and the use of aids has been neglected. Current knowledge suggests that optimal use of residual vision is equally dependent upon:

1. the prescription of optimal aids;
2. adequate visual training and training in the use of specific aids; and
3. motivation of the client for low vision training.

Training should include, but not be limited to,

1. familiarization with the size, shape and structure of the aids;
2. definition of the optimal lighting conditions for using the aid;
3. the visual field of the aid;
4. how to hold and focus the aid;
5. the limitations of the aid in terms of what it can and cannot be used to see;
6. the magnification effect of the aid;
7. if necessary, the proper viewing angle in using the aid;
8. scanning and tracking techniques; and
9. in the case of electronic aids (e.g., CCTV), the mechanical and electronic controls of the aid.

The type and extent of training necessary will depend upon factors such as the client's visual capacity, the number and type of aids prescribed, the client's motivation and whether or not the client has received training in the past.

Training aimed at improving the client's sensory-perceptual skills will emphasize the client's understanding of;

1. the visual loss and the remaining visual capacity;
2. perceptual constancies (e.g., near objects appear lower in the visual field than distant objects);
3. effects of light and shadow;



4. techniques for scanning and tracking visually;
5. techniques to maintain steady fixation effectively;
6. the use of other senses to supplement the visual system;
7. geographical constancies (e.g., typical location of street signs and address numbers on buildings;
8. techniques to obtain increased magnification without an optical aid (e.g., decreasing distance to object, large print materials);
9. cognitive strategies to help interpret ambiguous visual stimuli (essentially a reasoning process, for example, if a doorway is difficult to identify visually one can watch the direction taken by other people); and
10. techniques to optimize visual acuity or visual field (e.g. eccentric viewing or effective scanning).

Regardless of whether the training is aimed at improving the subject's use of an aid or his/her sensory-perceptual capacities or both, the training should take into account several factors. First, the client's initial work should be conducted so that there is a high probability of success. For example, when working with magnifiers the client should read print large enough so that it will be seen easily. More difficult tasks can be introduced later, but it is important for the client to develop an expectation of success, not failure. This "easy-to-hard" progression should be followed whenever a new task or aid is introduced.

Second, although standard materials are beneficial in qualifying results, it is helpful to have the client read material relevant to his/her goals. This material can be related to either vocational or avocational pursuits. In our clinic we have found as diverse a set of materials as law books, Playboy magazine, and horserace betting sheets to be helpful in motivating patients to read. Given the fact that variables such as visual acuity and visual field have little relationship to performance, the variable of motivation predictably appears to be powerful (2).

The element of time is a third factor to be considered. Whereas patients show a great deal of variability, it appears that learning to use a CCTV or optical aid can require more than ten days of training (2). Some sensory perceptual training techniques may require 12 to 15 days (3). Sufficient time should therefore be allowed for training and for the individual to practice with the aid or technique. In terms of low vision aids, this training and practice may mean the difference between an aid of potential value and an aid that is actually used (4). In short, it may be the difference between successful low vision care and failure.

A final element to consider is that the use of low vision aids and training are best implemented with the active cooperation of therapists and family outside the low vision clinic. If mobility

instruction is provided the O&M instructor should be aware of the prescription of a telescopic aid and have sufficient knowledge to help the patient learn to use the aid as part of mobility. The mobility instructor should also be aware of any training being conducted. This will help ensure that the training is transferred from the low vision setting into the client's daily activities. Family members can also be an important source of reinforcement for the use of aids and training, and an active effort should be made by the low vision staff to familiarize the client's family with the techniques and goals of the low vision clinic. This familiarization should emphasize the client's abilities, but it should also include information about the client's limitations. Without this element of caution the client may place himself/herself, or be placed, in a hazardous situation.

Low vision training needs depend on the client's needs and capacities and it is, therefore, difficult to enumerate all possible types of training. Figure 2 presents the most common types of training used at the Western Blind Rehabilitation Center. Since this is a facility serving adult clients, some modification might be necessary to adapt it for a younger population. However, the Figure may be considered to present the minimum variety of training each low vision clinic should be prepared to provide. Since the adult blind represent the majority of the low vision population, the Figure should be applicable in most low vision clinics.

In Figure 1 counseling is presented alongside training. Here we use the word "counseling" in its generic sense to include social work, psychology, family counseling, and a wide variety of therapies that may be applicable. The psychological adjustment to low vision may be as complex as, or perhaps more complex than, the adjustment to total blindness (4). The totally blind person may have some "advantage" in that he/she will belong clearly to a group of people without sight. The low vision person may not have this identity and may be torn between belonging to the group of sighted people or to the group of blind people. Such a sense of belonging to a group can be a positive and necessary step in establishing, or reestablishing, an individual identity. The counseling process can be helpful in this regard.

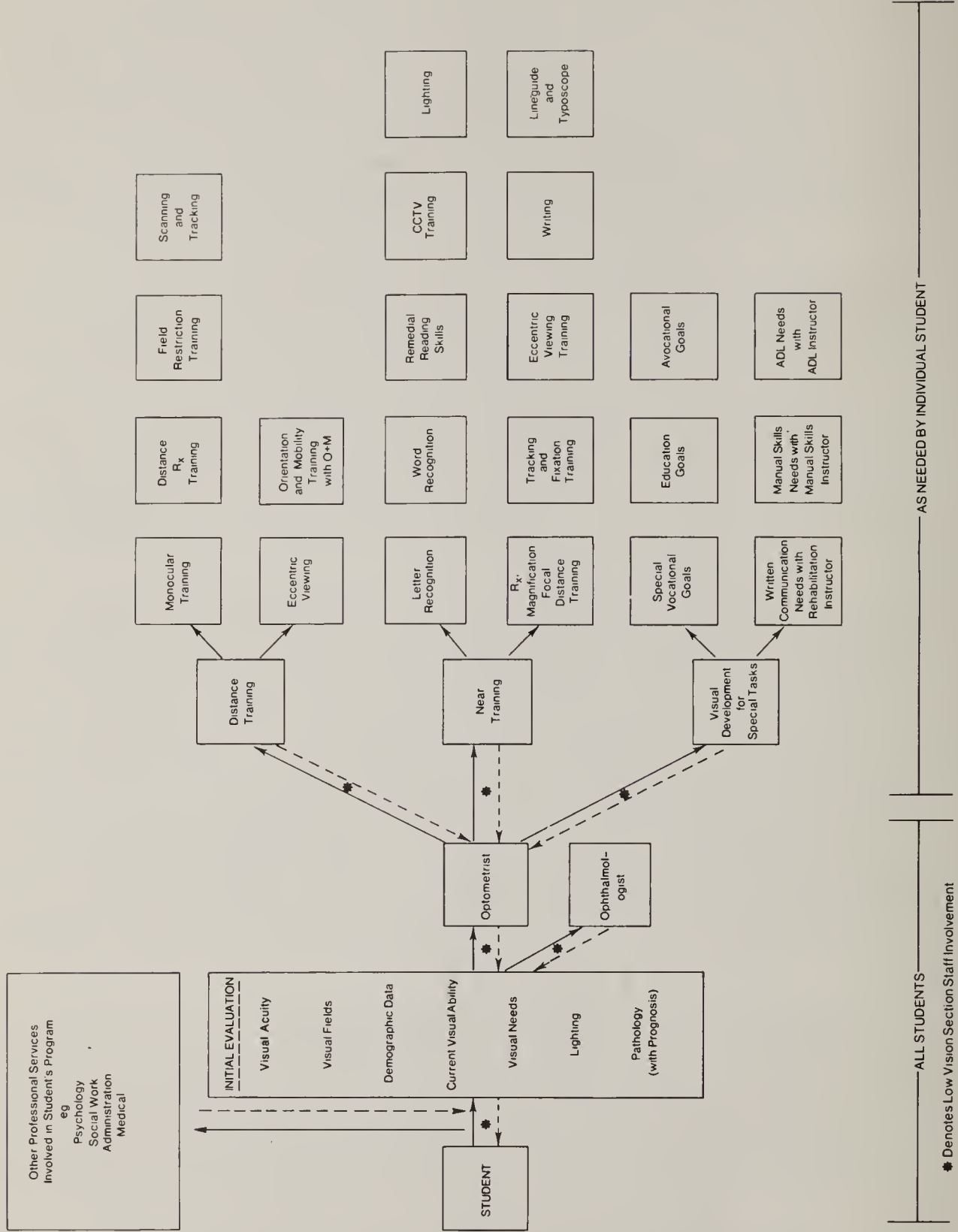
Counseling can also play a role in the low vision client's use of aids (4). These aids are often conspicuous. If the individual does not feel at ease in the use of aids, the aids will not be used optimally. Consequently the low vision clinic's efforts will be in vain. The counselor may be a critical individual in helping the client develop the ego strengths necessary to use some low vision aids successfully.

The counselor can also benefit the multidisciplinary team in other ways. For example, understanding an individual's personal, social, and familial situation can help other members of the team function to serve the client's needs in the best way. The counselor can also receive needed information from the low vision therapists. Among the types of information will be knowledge of the client's

Figure 2.--Flow chart of low vision clinic services. All clients entering a rehabilitation facility should receive a comprehensive low vision examination. Those clients with sufficient residual vision will then be referred for appropriate (individualized) low vision aids and training. (Similar flow charts were used by L. E. Apple and M. May in their chapter on Low Vision in Welsh, R. and Blasch, B. Foundations of Orientation and Mobility, American Foundation for the Blind, New York, 1979 and by G. L. Goodrich "Towards a Low Vision Rehabilitation Model" in Inde, K. (ed.) Proceedings of the International Workshop on Low Vision, Uppsala Reports on Education, Uppsala, Sweden, in press. Reprinted with permission of the authors and publishers.)



Figure 1



visual capacity, current and potential level of visual functioning, and information concerning his/her current social and vocational or educational performance.

The final area of the model of low vision services is followup. The low vision individual, like all human beings, changes over time. Occupations change, houses are sold and new ones purchased, new friends are made, visual pathologies may change, new pathologies may develop, vision, including residual vision, changes as the result of aging. Any change may require new training, prescription of new aids, and/or the delivery of new services. Part of the function of followup will be to ensure that the aids, training, and service are made available to the client who needs and wants them. The followup activity should also provide information to the client concerning new developments that may be of benefit. The followup should also help the client assess needs. Is a new prescription necessary or would a new training program be more appropriate? Where is the most appropriate place to go, and how are contacts made?

Followup should provide all these benefits to clients. But, followup should also be a mechanism for evaluating low vision services. Every clinic can state how many clients it has seen in a year, but few can state how many clients they have helped. Have clients gotten new jobs or been helped to lead as an enjoyable and a productive life as possible? Have clients received aids or training that they actually use? Would additional visits for training help? Is additional counseling necessary? Would a mobility aid serve the client better if more mobility instruction could be provided in the client's home or vocational environment? Such questions can be answered easily with an adequate followup mechanism.

It is a paradox that most low vision clinics strive hard to provide aids and services to clients, but spend little or no time and energy in finding out if the aids and services have helped the client. Few followup programs exist. Most that exist do so for only a limited time and for limited goals. The absence of an adequate followup program short changes both the client and the low vision clinic. The former may not receive adequate service because the continuing need is not identified. The latter is deprived of the mechanism whereby necessary improvements can be made, the mechanism to continue or obtain additional funding, and the satisfaction of knowing that the clients' needs are being met.

The above model is presented as a possible means to an end, namely ensuring that all people needing low vision services receive them. It is not necessary for all low vision clinics to be organized and function the same way. However, each must provide certain minimal services. We hope that this model will be useful in delineating the necessary services.

## Low Vision Needs in the 1980's

The field of low vision has made great strides in the past decade. Many more people are currently receiving services than at any previous time. The variety of aids available to help the client is greater, the types of training are more extensive, the numbers of trained professionals have increased. In general terms it is difficult to understate the growth in the field of low vision. It is also tempting to become complacent and uncritical. Despite the rapid growth in knowledge concerning low vision, many areas still need improvement. The room for improvement is nearly as great as it was 10 years ago. The following are some of the areas we believe need the greatest improvement.

1. The American Foundation for the Blind's "Directory of Low Vision Services" lists over 150 low vision clinics in the United States. Over 50% of these clinics operate only 1 day per week, and approximately 30% operate 1/2 day per week or less. The provision of low vision services should not be a parttime occupation, since the attempt to deliver services on a parttime basis cannot, except perhaps in a few exceptional cases, provide adequate care. Operating one day per week or less means that staff cannot maintain adequate levels of skill, training cannot be provided, and interdisciplinary communication cannot occur. It is important that in the coming decade the provision of low vision services become an established area within the field of rehabilitation. It should be an area that is recognized as serving the most numerous subgroup within the blind community and that services be delivered accordingly.

2. In the United States, as well as in many other countries, students can obtain degrees in orientation and mobility, rehabilitation teaching, and/or do specialized graduate studies dealing with contact lenses, retinal pathology, and in a number of other related areas. There are no broad graduate programs in low vision, nor are there mechanisms other than a few courses, for interested students to specialize in this area. While it is true that students in orientation and mobility and rehabilitation teaching receive some course work in low vision it is insufficient in scope and content. In the other professional disciplines necessary for low vision rehabilitation (e.g., optometry and ophthalmology) the educational situation is as bad or worse, although there is a trend to provide a limited amount of coursework and practicum experience. Most experience in the area of low vision is acquired through trial-and-error and through on-the-job experience. These instructional methods are not sufficient and cannot meet the demand for qualified personnel. Thus, in the future, university programs will have to recognize the diversity and complexity of knowledge that is necessary to provide their students with sufficient expertise to function effectively in the field of low vision. This will either require the development of new graduate programs or extensive modification of existing graduate programs.



We would not want to see the development of low vision programs detract from the present blind rehabilitation programs in universities. These programs are important resources for people entering the field of low vision. The low vision teacher's education should include some knowledge of these programs, as well as coursework in visual pathologies, anatomy and physiology of the visual system, dynamics of blindness, principles of blind rehabilitation, optics, low vision aids, low vision evaluation, low vision training, and professional (supervised) field experience. Additional coursework in psychology and counseling would also be desirable.

3. Low vision is a multidisciplinary service. It requires trained low vision teachers, optometrists, ophthalmologists, psychologists, social workers, administrators, and persons from other disciplines. Currently there are severe shortages of professionals in all these disciplines trained in low vision. Even with adequate funding it would not be possible to provide the needed low vision services because of this shortage of skilled personnel. Thus, it is necessary to encourage people to enter the field, and to provide them with an adequate educational background and continuing educational activities.

4. In part, because low vision has not been recognized as a needed service for over 80% of the legally blind population and because it has not received adequate attention in universities there is an inadequate level of funding for low vision programs. The level of funding is reflected both in monies to provide patient care and in monies for low vision research.

Although estimates of the blind population vary and none are completely accurate, it appears that there are some 3 million legally blind individuals in the United States. Approximately 2.5 million have some usable vision. Thus, each of the 158 low vision clinics reporting to AFB has a potential population of about 16,000 clients. Clearly, demand exceeds the supply of services, and the situation will grow steadily worse unless an adequate plan of service delivery is instituted.

5. The research needs of low vision are too numerous to mention here and have been adequately surveyed elsewhere (7). Rosenbloom's paper presents a rather comprehensive listing of research needs in low vision. We would like to suggest a few more areas to be explored, and hope that these will receive greater emphasis in the near future.

a. Develop a truly portable closed-circuit television (CCTV) system. Some work has been done along these lines; however, more work, especially in developing acceptable monitor displays, is necessary. Current "portable" systems cannot be moved as easily from one location to another as is necessary. There are also severe performance deficits (e.g., in reading speed) resulting from the smaller monitors of these units as compared with the performance of larger CCTV systems (5). A large number of low vision persons would benefit from an improved portable CCTV.

b. Research in the development of improved ophthalmic lenses and/or systems is needed, especially in the areas of full-field optical systems and lenses with increased focal distances. Current optics do not allow completely satisfactory correction of severe field restrictions, and a frequent complaint of low vision clients is the extremely short working distance they must use in performing near work tasks.

c. A new and promising technique using spatial contrast sensitivity functions is emerging. The Arden Plates, in particular, are a good potential source of clinical information. To date, the results of testing with Arden Plates and similar gratings have not been examined with respect to performance in low vision clients. In the future research relating performance to results of contrast sensitivity functions (CSF) will be a fruitful endeavor.

It should be noted that the vast majority of research funds in the area of blind rehabilitation are not devoted to the needs of the low vision person. A major challenge will be the allocation of additional funds for research in the area of low vision, either by locating new funding sources or by a redistribution of existing funds to best meet the needs of the entire population.

In the long term, the development of adequate low vision rehabilitation services is the only economical alternative for society. The choice between maintaining a person on welfare or providing the individual the means and incentives to become self-sufficient is self-evident. The low vision person is, like the totally blind person, capable of working, attending to his/her own needs, and leading a full, productive life. It may be necessary to provide some aids and some training to make this possible, but the cost is much less, in both human and economic terms, than is continued dependency.

6. There is also a need to define the necessary skill levels of professionals in the field and to define standards of service for agencies offering low vision services. Most people in the field of rehabilitation have had some experience with certification and accreditation, and for many this has not been a pleasant experience. Yet for the field it has been necessary. We wish that we could state our belief that certification and accreditation in the area of low vision will be easy. It is likely to be difficult, but also necessary. Several reasons account for the level of difficulty. First, some agencies are already accredited to provide certain services in rehabilitation. Either new accreditation procedures will be needed or old ones modified, since not all clinics are covered by existing accreditation procedures in the field of blind rehabilitation, nor can they be. These include professionals in private practice and schools of optometry to mention a few. Thus the accreditation procedure will either have to accommodate different standards for different clinics and agencies or else separate standards will have to be developed.

Second, to certify individual professionals it will be necessary to define adequate knowledge and skill levels. This will be a difficult procedure because there are no low vision graduate programs. Third, because low vision is multidisciplinary, and many of the professions involved (e.g. optometry, rehabilitation teaching, and ophthalmology) have existing certification standards it will be necessary to accommodate these standards, as well as to create new ones.

Finally, certification and accreditation will be difficult because there is no accepted definition of low vision or of low vision services. In many respects low vision is a figment of our imaginations. The Federal and state governments provide money for blindness, but not for low vision per se. Only recently, and slowly, have agencies begun to provide services for the visually impaired, not just for the blind. On the positive side the New Outlook for the Blind has become the Journal of Visual Impairment and Blindness, thus recognizing the legitimacy of categories other than blindness. Some people in the field and most people in society do not know to what the term "low vision" refers, nor is it a particularly adequate term. For these and many other reasons certification and accreditation will be difficult, but necessary, goals.

#### Summary

In the beginning we quoted the 90-90 Law of Project Schedules. If it is true that we are 90% completed towards our goal--a very tenuous assumption--then the remaining 10% will, indeed, take the other 90% of the time.



## References

- Mehr, E. B. and Freid, A. N. Low Vision Care. Chicago: The Professional Press, 1975.
- Goodrich, G. L.; Mehr, E. B.; Quillman, R. D.; Shaw, H. K.; and Wiley, J. K. "Training and Practice Effects in Performance With Low Vision Aids: A Preliminary Study." American Journal of Optometry and Physiological Optics. 1977, 54(5), 312-8.
- Holcomb, J. G. and Goodrich, G. L. "Eccentric Viewing Training." Journal of the American Optometric Association. 1976, 47(11), 1438-43.
- Mehr, H. B., Mehr, E. B. and Ault, C. "A. Symposium on the Rehabilitation of the Partially Sighted." American Journal of Optometry and Archives of American Academy of Optometry. 1970, 47(8), 605-12.
- Goodrich, G. L. and Quillman, R. D. "CCTVs: Choices and Considerations." Journal of Visual Impairment and Blindness. 1978, 72(2), 68-9.
- Ault, C. "The Impact of a Blind Member on Others in the Family." In Mallinson, G. G. (ed.), Blindness Annual 1977-78, Washington, D.C., 1978.
- Rosenbloom, A. A. "Research Needs in Low Vision." American Journal of Optometry and Physiological Optics. 1978, 55(11), 776-9.

## COMMUNICATION SKILLS

*The two articles in this section explore various devices and methodologies for improving the communication skills of the visually impaired. Both deal with braille and many other devices that were developed from advances in electronics, particularly miniaturized circuitry. Thus there is some overlap. However, the presentation by Glaser reflects the background of a person who has been intimately involved with the development of hardware. That of Lauer and Mowinski emerges from practical experiences with clients, since both are service providers to visually-impaired veterans.*

*The articles complement one another admirably and offer the possibility of comparing ideas about improving communication skills of the visually impaired from two different vantage points.*

### MODERN TECHNOLOGIES APPLIED TO COMMUNICATIONS FOR THE BLIND

by

E. L. Glaser  
Vice President and Chief Technical Officer  
Products Group  
System Development Corporation  
Santa Monica, California 90406

#### Introduction

I first became aware of electronic devices for the blind in the Spring 1950. It was in one of the back rooms at the American Foundation for the Blind that Charles "Chick" Ritter first showed me some of the early attempts at developing reading aids for blind persons. These machines were, by present standards, crude. Yet, they exhibited some of the characteristics of modern-day devices. One of them, housed in a large wooden desk, photoelectrically read pages that were wrapped around a cylinder. These pages were then reproduced in raised letters on framed sheets of tin foil. The second device, housed in what appeared to be an old phonograph case, transformed various character shapes into sound patterns. It was alleged by the

designer that a blind person could read with this device. There is no record of any blind person ever having used the device successfully.

Both of these machines had the basic elements that are required of any reading device. Each had a photoelectric sensor and a component to transform the input to the sensor into an intelligible stimulus for the blind. Each also had an output device. In the first unit, the translation was merely amplification and the output device was a stylus that scribed the raised letters on sheets of foil in facsimile fashion. The second device, called an Optiphone, used a spinning optical disk to break up the characters into their component parts and to transform these various visual parts into sounds.

There were two important elements not available for these early efforts. One was digital technology that has recently come to the fore. The other was the integrated circuit that has brought about tremendous reductions in appliance size and cost as well as increased speed and reliability. These have revolutionized the development of vast numbers of devices from pocket calculators and electronic watches to giant computers and television systems.

These were not the first attempts at specialized communications aids for the blind. The first of which I am aware was the system of raised dot writing invented by Louis Braille at the end of the 18th Century. Other forms of raised dot writing, as well as raised line writing, have been attempted since then. The braille system, however, has been accepted in one way or another as the international standard. In braille, a human being takes the place of the sensor and transformer. The only mechanical aid is the actual writing device that produces the raised dots on a sheet of paper. Initially, this was a slate and stylus. Later, braillewriters were used. Today, we have several forms of mass braille production.

A second device was adapted for use for the blind in the United States in the mid 1930's. It was an ordinary phonograph on which books were recorded at transcription rate rather than normal record speed. These "talking books" are still distributed to blind subscribers by branches of the United States Library of Congress. As with braille, the sensor and transformer functions with this hardware are performed by human beings, while the output device is merely an adaptation of the phonograph. But, it was not until the late 1950's and early 1960's that serious attempts started to yield effective reading devices for the blind. Of all the different devices that were attempted, two must be noted. Development of the first, the stereotoner, began in the late 1950's. This device employed a hand-held photocell scanner that was moved across the printed page. Circuitry within the unit transformed the output of the sensors into various tones that were presented stereophonically to the blind user. As a consequence, a "stereo pattern" could be determined by the blind user as corresponding to a specific character or set of characters. In the mid 1960's, a group from the Stanford Research Institute, working with individuals at Stanford University, produced the first tactile output for a reading machine. This system later developed



into the optacon that is currently being produced by Telesensory Systems Inc. in Palo Alto. In this unit, a hand-held photo array scans a line of print. Whatever the photo array senses is mapped into a set of vibrating points under the finger of the user. Whatever shape is perceived by the photo array is mapped directly into an identical shape that is tactually sensible to the blind reader. A number of blind people have learned to read fairly successfully with this mechanism which also enables them to sense simple graphs and line drawings.

Note the similarity between this unit and the earlier one that mapped the visual marks on a page into raised line marks on a sheet of tin foil.

Another important step took place during the 1960's in the application of technology to communications for the blind. In conjunction with the International Business Machine Corporation, the American Printing House for the Blind in Louisville, Kentucky, experimented with the use of a modern digital computer for translating normal text into braille. The computer neither sensed the characters nor produced the final braille output directly. The initial input was provided by human beings who did not understand braille. They produced machine sensible input in the form of punched cards. The output of the computer was a set of cards or a tape that drove a stereotype machine. The machine made master plates for production of pressed braille books. The computer translated the letters and punctuation of normal text into the necessary contractions and other syntactic variations that are unique to braille. Skilled braille transcribers were replaced by individuals who knew how to keypunch or type but did not know the unique characteristics of braille code.

Another technological change that took place in the late 1960's and early 1970's is also worth noting. During this period, the talking book was modernized by the change from normal track size to a microgroove recording similar to those used in the modern L.P. record. The speed of the records was then dropped from 33 1/3 to 16 2/3 and finally to the present 8 1/3 speed.

Since the late 1960's, a new service has been offered through the Library of Congress by means of another readily available consumer device--the tape recorder. The cassette recorder was first adapted for the blind by using a lower speed than normal that enabled twice the information to be packed on a cassette. More recently, the 4-track cassette has brought about another doubling of the amount of information per cassette. The importance of the cassette is twofold. First, because of their small physical size, both the cassette and the recorder make reading materials and reading devices more readily accessible and available to the blind. Second, this is the first unit in recording media available to the blind that makes it possible to stop in the middle of a book, put it aside, read something else on the same machine and go back to where one left off. The stage is now set with all the pieces of technology that are needed for producing a wide variety of new prosthetic aids. The question is, "What are we going to do with this technology?"

## Current Advances

The major aim in the development of reading aids has been to make a large amount of man's literature available to the blind individual. This is a necessary and worthwhile task. However, it is not sufficient. We read, among others, books, plays, monographs and dissertations. But the sighted population also reads journals, magazines, newspapers and other items of less than lasting value. The blind population should not be cut off from this temporal literature.

The computer is helping to solve this problem with a new type of appliance for the blind, the reading machine. The first reading machine was made available in the mid 1970's by the Kurzweil Computer Products Company of Cambridge, Mass. This device enables blind people to read normal printed material. The material is placed on top of a scanner similar to a small office copier, and the integral computer causes the material to be scanned and the characters on the page to be recognized. The output of the optical character recognition is then processed by pronunciation rules and relayed to a synthetic speech output unit. The machine reads the document or book in real time, pronouncing the words with a relatively high degree of accuracy.

Newer models of this machine are becoming available and are just starting to appear in individual companies and offices in addition to libraries. Other systems of this kind should become available from additional manufacturers over the next several years. This device is unique, in that no specialized processing of material is required. It gives the blind reader direct access to virtually all printed material.

To date, the development of communication devices for the blind has centered on reading aids. But what about the writing process and other modes of communication? Braille has been the main means by which a blind person writes. With braille, the writing is practically always for his or her own use, or the use of other blind persons. Many blind people can type, and many use longhand when they wish to communicate with the sighted population. However, the writing process is more than placing information on paper. Editing is an inherent part of the writing process, as any professional writer will attest. Editing includes the ability to insert, delete, change or otherwise alter the first impression placed upon the paper. Braille in its earliest form as slate and stylus did not provide this possibility, except with great difficulty. Even modern braille writers do not permit easy editing, since space needs to be left to make the insertions and other changes. This makes highly inefficient use of the paper, and it is difficult for the writer to reassemble thoughts using these devices. The cassette recorder has helped, in

that a person can listen on one cassette and redictate on a second. However, this system is less than fully satisfactory.

We see the beginnings of a technology today that should improve the entire area of editing by the blind. The first of these is the "soft copy" braille display. In this device, pens are raised and lowered to display temporarily 10 to 20 characters of braille. The information fed into this display comes either from the keyboard or from previously written information that has been recorded on a cassette. It should be noted, in this case, that the cassette is used not as an audio device. It is used to store digital information. A unit of this type is currently being manufactured in France, and a second one with somewhat greater display size and storage capacity soon will be available from Telesensory Systems in the United States. Both devices use an integral micro computer to facilitate insertion, deletion, or changing of data. Thus, many of the features of modern "word processors" or "electronic typewriters" that are now coming into offices are being made available to the blind.

The type of device represented by these braille display cassette combinations can lead to a new form of published material for the blind. These cassettes can be generated directly from the computer more easily than masters for a pressed braille book. The cassettes can be duplicated on appropriately designed cassette duplication machines and distributed more easily than braille books. Thus, the same unit can be used for writing braille, editing braille, and reading generally distributed books and periodicals made available in cassette form.

Audio output devices also could be adapted for editing. In this case, a document would be stored in digital form, having been entered from a keyboard. However, it would be read by having the machine either spell the words or pronounce them from pronunciation rules stored in its computer memory. The editing would take place directly on the "spoken work," and modifications would be made by keyboard. It is worth noting that computer technology also has been applied to the cassette recorder. By means of digital technology, it now is possible to hear a tape at two to two and one-half times the normal speed without the normal pitch change that makes everyone sound like Donald Duck. As a consequence, a blind person can take the inherently low speed input of a recorded book or paper and read it at a more significantly useful speed.

There is a need for more than reading, writing and editing devices. Examples of these additional needs are found in everyday instructions such as "This Side Up;" "Set oven to 350 degrees and bake for 25 minutes;" "Baggage downstairs and to the right;" and so forth. These are all examples of the various ways we find it necessary to leave instructions, labels, signs and directions for one another. As a traveler who is also blind, I have been grateful that elevator buttons are now starting to be marked in Braille in certain public buildings. On the other hand, I have wished on occasion that I knew where to look for the elevators. Feeling all possible walls for the



presence of a direction seems to be less than a satisfactory solution! This area of signs, labels, and instructions still needs much work. Specialized braille units have been made for producing small, inexpensive labels, but that still does not help in the majority of cases.

### Creating Appliances for the Blind

The design of any consumer product or appliance, under most circumstances, is a tricky job. The needs of individuals must be met, their likes and dislikes considered, and the necessary "human factors engineering" must be taken into account. In the case of appliances for the blind we meet additional problems in that the population is small, and that we seldom have time to do things right the first time and the money to do them over the second. Competition, which solves the problems in most cases for the general population, seldom solves them for the blind. Not everyone in the general population uses a digital calculator, an office copier or a digital watch. Yet, there are enough different kinds of appliances that serve similar needs that most people in the population can be served.

In the case of the blind population, this diversity is not served by having multiple products. Therefore it is essential that the design be right the first time or there must be ways of upgrading the design of a unit once it is in the field. In designing for this population, we are always walking between two extremes. On the one hand, we have "It's better than we have now, so don't complain." The other extreme is reminiscent of one of the characters from Lewis Carroll's Through the Looking Glass. The white knight in that classic tale was encumbered by many devices because he "might need them some day." Devices that are overly specialized end up not being used much except under unusual circumstances.

The remainder of this section is not meant in any way to condemn the current work by various organizations for the blind. Rather its aim is to point out the difficulties that all these organizations face and perhaps to suggest that additional work and support for this work are needed. Examples of not having enough time to do things right the first time can be found in the attempts to produce a special tape cassette for talking books. This area is legion with half-baked concepts and inventions, both in this country and elsewhere. Further, we often set a standard only to find that for one reason or another it is not satisfactory and we have to go back and redo it.

I should like to give my own set of questions and guidelines that I hope designers would consider for future appliances. I make no claims for them other than that as a designer of consumer products for the general population I have found that some of these can be helpful. Some of these products have been adapted specifically for the area of the blind.

1. Make the design forgiving. Don't ever say to yourself, "They'll never do that sequence of operations." They will.
2. For a machine to be portable, it must have a reasonable amount of weight and size so it can be carried by an ordinary human. A handle, it and of itself, does not make an appliance portable.
3. Why do I have to carry so many devices for charging different batteries? I have more chargers than I have working devices!
4. Why do I have to go to a machine to use it? It makes much more sense to have the machine come with me if at all possible.
5. Blind people have only one hand. The other one is either on somebody's arm, a cane or a guide dog's harness.
6. Make sure you know what's going on in equivalent fields for the general population. Corollary: The only kind of plagiarism that is inexcusable is stealing a bad idea.
7. Corollary to 6: Inventing the wheel is not only nonproductive. The wheel often ends up square.
8. Taking a consumer survey is always helpful. You can find out what they want and need.
9. Corollary to 8: After having taken a consumer survey, do your own design. Don't let your consumers do it for you. They are the consumers. You are the designers.

In summary of the above, engineering is still the art of applying experience and knowledge to solve a set of problems. In other words, we cannot get out of the necessary job of system engineering. This means getting as much functionality as possible at the lowest price. It also means getting the greatest flexibility with the greatest simplicity. A good rule is, "Once you've found out how to do it, generalize, simplify and apply."

#### Directions for the Future

One can conceive of many kinds of communications devices for the blind. I for one would love to see something with good braille display, digital storage, the ability to read print, and an optional speech output--something I could purchase at a reasonable price and carry in my briefcase. (By the way, I am not a weight lifter.) This is not as farfetched as it sounds. It will be possible a few years in the future. The nature of digital electronics is such that we can expect a 30% reduction in size and cost for the commensurate function each year. This does, however, pose a significant problem in terms of the economics of appliances for the blind. With this rapid a change, can we afford the necessary development that will bring a

product to market for such a limited population? Further, once such a unit is in the field, how can we keep the unit updated or produce it at a price that the user can afford? I leave these as problems for the reader. Currently, I don't have any solutions.

If there is one thing we can have learned by examining the history of communications aids for the blind, it is that wherever possible we should be adapting devices that already are consumer or industrial products for the general population. By doing this, we have the advantage of existing mass production. The only specialization is that of the adaptation for use by the blind. Certainly we could not have had the quality of cassette recorder that is now available were it developed only for the blind.

One example of a currently available technology that could be adapted are the home or hobby computers. These ubiquitous devices are now being applied in all kinds of areas including small businesses and professional offices as well as homes. In fact, a specific vendor already has adapted a machine for speech output. In addition, limited braille instructions are available so that a blind person could program this machine for his or her own use. These computers also could be used as specialized communications aids for the blind.

A technology that is just coming into use that could be helpful to the blind is that of the Universal Products Code. This code is imprinted on cans, boxes, milk bottles, and other containers and read by machine. This bar code is forgiving as to how it is scanned and is designed to be error correcting. It has been developed for automatic reading of labels in supermarkets. A hand-held device with speech output could be of real use to the blind. A significant use of this technology could be in labeling. Since these labels could be placed on canned goods, boxes or clothing by an appropriately designed ink printer, it would be possible for a blind person to label his or her own articles of food, clothing and other objects for scanning by the hand-held device later. One could conceive of a labeling device for clothing, for example. It would imprint numbers that the hand scanner later would translate into verbal cues of use to the blind owner.

The key element in all of these is really applied research or advanced development. There are several centers, both in this country and elsewhere, that are trying to develop new appliances and aids for the blind, but there is always limited dollars available for such advanced development. If the organization is nonprofit, it has the problem of funding either from Federal and state sources, grants from other foundations or public donations. If it is a for-profit corporation, the problem is to get the product out the door so that the cash flow can maintain additional research and development in other areas. How to resolve this dilemma is still a question. What is needed is a more integrative approach to Federal funding in this area so that we know our dollars are going as far as possible. Unfortunately, not too many individuals have been interested in doing work in this area. Further, individual contributors in these areas



may be highly competent in one expertise and still be lacking in others. There must be a higher degree of professionalism shown in the area of advanced development. Again, it is not a question of damning what has been done, but rather a plea for more work to be done, striving for higher quality in terms of both the work and the results.

### Conclusion

To draw any conclusions from this general view of what is happening is at best difficult. For the first time we have technological tools that can solve most of the problems of communications that are faced by the blind. We have microprocessors, low cost storage in the form of various kinds of tape cassettes, tape cartridges and low cost flexible disk memories. We have the equivalent of braille and character displays. We have speech synthesizers that can permit a machine to talk. We have machines that can recognize characters, and within the next few years we will have machines that can recognize speech.

In short, all the necessary ingredients for producing a rich set of appliances for the blind in the area of communication are available now, or will be shortly. The challenge is to employ the necessary creativity to build these into a few powerful and general units that can be used by most blind people. Further, we need to understand how to adapt them so that more specialized needs can be met, but only if the cost reduction is commensurate with the additional engineering required. Finally, what is most needed is some mechanism whereby the necessary advanced work can be performed and made available to the blind population.

# COMMUNICATION AIDS FOR THE BLIND

by

Harvey Lauer  
and  
Leonard Mowinski  
Blind Section 117A Veterans Administration  
Medical Center  
Hines, Illinois 60141

## Introduction

When literacy was a skill possessed only by certain professionals, the inability of blind people to read was a minor handicap. However, the use of the printing press revolutionized education and made the invention of braille, from our point of view, a virtual necessity. Even if braille and sound recordings were fully implemented, we would still be handicapped in using the printing press if for no other reason than that we cannot read its output directly. Now, the typewriter and computer have revolutionized communications, but they are also mixed blessings for blind people because our communication with them is mainly one way.

As typewriters, computer printers and video terminals are being multiplied, our handicaps increase because our means to read their products have not increased proportionately. We therefore consider reading machines and associated instruments such as talking and braille terminals as necessary tools rather than bonuses of science. If we do not get good tools soon, most business and professional jobs may become closed to us. Further, we will become even more dependent on other people in the conduct of our personal business.

## Reading Machines--Direct Translation

The first reading aids can be classified as direct translation reading machines because they presented the shapes of printed characters as either tactile or audible patterns. The first such machine was the British Optophone built after World War I and is used currently by a number of people. The most recent optophone, the Stereotoner designed and built in the early 1970's, by Mauch Laboratories of Dayton, Ohio, is no longer manufactured. There are about 20 users.

The new Kurzweil Reading Machine, as explained later, will have an optophone-like output. An optophone presents to its user the shapes of printed characters in tonal patterns. For example, high tones represent the top portions of letters whereas low tones represent their lower portions.

The Optacon made by Telesensory Systems, Inc. (TSI) of Palo Alto, Cal., is a direct-translation reading aid with a tactile output. It presents the shapes of printed characters as vibrating patterns on an index finger. It is currently available, and several thousand Optacons have been sold.

### Reading Machines--OCR

We now turn to the far more sophisticated category of reading machines called the optical character reader or optical character recognition machine. OCR machines use a computer to identify printed characters, so their outputs can be presented as spelled speech, full-word synthetic speech or braille. Among the pioneers in this area are the Mauch Laboratories, Massachusetts Institute of Technology and the Stanford Research Institute. There are at present several ongoing efforts to build OCR machines for the blind. The Israelis call theirs the Textobrail, and it has a braille output. The work in Canada is conducted at Concordia University by Drs. Michael Bedoes and C. Y. Suen. The builder of the Optacon, TSI, is working on an OCR machine, that will be described later, to be used with the Optacon.

The one available OCR machine for the blind is the Kurzweil Reading Machine (KRM) made by Kurzweil Computer Products, Inc. of Cambridge, Mass. Using an automatic scanner and a mini computer, it presents its output to the user in full-word synthetic speech.

### Who Reads--Machines or People?

In our view, machines can read only for other machines. People can read for themselves or for other people. What machines can do for people is translate or transcribe. We think of reading as a four-step process: scanning or tracking, character identification or recognition, speech or language conversion, and comprehension. By definition, only a human can comprehend.

The KRM is much faster, and easier to learn, than a direct-translation machine because its computer performs three functions that are directly related to reading. It scans print, recognizes characters and does speech conversion. In theory, the user is then free to perform the function of comprehension at a higher speed than with an optophone or Optacon.

Unfortunately, the computer yet cannot do its assigned jobs perfectly. For example, the task of scanning or page-format handling



is as formidable a task for a computer as optical character recognition itself. Programmers in this field have only begun to work on it. In the area of OCR the Kurzweil developers have made their most significant breakthrough, yet much work still remains to be done. The third task of speech conversion has been most successfully accomplished. To be sure, better speech is needed for reading machines and other uses, but it should not be improved at the expense of more necessary improvements. At this point it takes only several hours to learn to use the spoken-word output of the KRM. It takes much longer to accommodate for the errors made in format handling and OCR. We therefore believe that these errors need to be corrected first.

### Hand Scanning Option

A hand scanning option is being designed for the new desk-top Kurzweil Reading Machine. With it the user will move a "pen" on a "tablet" to control the camera remotely. When the computer has trouble sorting out columns, titles, footnotes and pictures, the user can examine the page format and direct the system accordingly. This may not require much training. If the computer cannot decode damaged or unusual print, the user can do the job although this will require greater skill. If a name and address is needed from correspondence on which the computer makes occasional errors, the user can verify the needed data by hand but read the body of the letter automatically using context cues to correct the errors.

The skill to which we refer is the ability to use a direct translation reading machine. Either a tactile or audible output can be used. The first version of the hand scanning option will have a 12-tone audible output. We hope that later versions will have provision for connection to an Optacon.

The hand scanning option should make possible the reading of a wider variety of work-related materials. It was designed as a result of demands of visually-impaired clients and workers for the blind. The existing model of the KRM requires print of high quality, handles only simple page formats, and permits reading at half the normal speaking rate. The new desk-top KRM should enable the reading of print of ordinary quality in a number of common page formats at the speed of spoken English. The machine scans faster than that, but time is needed for format handling and some rescanning. We still expect high error rates on print of poor quality that is commonly found in many homes and offices. We are not sure if newsprint and cloth-ribbon typing will be automatically readable; and we know that complex formats like bank statements and computer programs will be unreadable with the fully-automatic portion of the KRM.

## A Talking Optacon

As noted above, Telensory Systems, Inc., is planning to use the I/O jack of the Optacon for its computer input. The user will scan with the Optacon camera and identify characters the computer cannot identify. Assuming the engineering problems remaining will be solved, there are three advantages this system will have over a fully-automated one: (1) It should be half the size and price; (2) the computer does not need to be programmed for the difficult task of handling page formats; (3) and it should be more versatile because the human user can learn to cope with print styles and formats that still "stump" the computer. The disadvantages, however, are these: (1) much more training is involved to take full advantage of this system; (2) the human user also finds formats difficult to analyze; and (3) many people find the hand tracking of print to be a tedious and demanding task.

A second version of the TSI machine is planned in which the user will have the option of hand tracking or automatic scanning. This version may be comparable to the new KRM with the hand scanning option. A third fully-automatic version is planned that may be comparable to the KRM without the hand scanning option.

### Do We Need a Better Tracking Aid?

Most users of Optacons would probably say "No," but in our opinion, that is because they have never used a good tracking aid. The best tracking aid to date is the Mauch Colineator although it needs redesigning for use with the Optacon. It is no longer in production and available only in the VA. Most people who use it prefer it whenever portability is not an issue. The Colineator can be used with books, magazines and single sheets of paper. Because the camera is held by a vertical shaft, both hands can be freed for taking notes without losing position on the page.

TSI engineers are studying the Colineator and other aids because the computer to be used with the Optacon would be highly inefficient in combination with unaided hand tracking. We are sure that regular Optacon users will also be in store for a surprise blessing if they have access to, and are made aware of, an improved tracking aid.

### A Bimodal Reading Aid For Touch and Hearing

An audible attachment for the Optacon has been built by engineers at the Illinois Institute of Technology. It is the first

bimodal reading aid, and is referred to as the Optaudicon. Its value is being tested at the Hines Blind Center. The present model provides the user with a 12-tone stereo output. So far it has enabled us to prove one fact and to work on several other hypotheses. We are certain that the electronic input or "retina" of the Optacon is superior to that of the Stereotoner. If this had been discovered several years ago, we would have insisted on redesign of the Stereotoner or its replacement with an audible output for the Optacon. The difference is so great that we believe the reevaluation of the audible code is warranted.

Tentatively, we find that Optacon students prefer to use both outputs simultaneously. This is not surprising for two reasons. (1) Many things are naturally experienced with two or more senses simultaneously, and (2) each code presents some letter features better than the other one. Stereotoner users prefer the tonal output of the Optaudicon over the Stereotoner. Both they and Optacon users like this bimodal approach, and after several hours experience prefer to continue using the instrument. So far, only one prototype has been built. Further tests will be conducted. The authors have a more extensive article on reading aids with a more complete report of this work. It is unpublished but is available upon request.

#### Braille: The Mainstay

It would be difficult to overestimate the value of braille in the lives of countless blind people. The braille writer is probably the most widely used machine invented exclusively for blind people. It now remains to be seen whether paper braille (hard copy braille) will be augmented or partly replaced by paperless braille recorded on tape. The availability of recordings is only partly to blame for the reduction in the amount of braille reading. We think the problem is mainly that braille technology has not kept pace with recording technology. This is most unfortunate because for several purposes braille is the preferred tool.

First, revision of the braille code is needed, we believe, so that it will be easier for people to learn, and easier for a small computer to translate, it into Grade Two. Second, more automated production techniques are needed for both small and large-quantity production runs. Computer-assisted library services should produce both braille and recordings from computer files.

A nation-wide computer-assisted library service accessible by phone could maintain a large collection of master copies in compact floppy-disc storage. Books could be automatically duplicated for each use, particularly if paperless braille is the medium used and then recycled. The result would be a fast service and a reduction in storage and shipping costs even if hard copy is the medium used. It would also be feasible to keep on file master copies of old books and back issues of periodicals.



Paperless braille may help to implement these goals provided a system is standardized. So far, none of the tapes or components produced by different manufacturers can be used with any other system. Implementation of the above goals will be costly at the outset, but it should greatly reduce operating expense and increase the availability of both braille and recorded materials. It should therefore reduce the handicaps of most blind people.

### Paperless Braille

Paperless braille is the term now being used to describe the system by which braille impulses are recorded on a standard cassette. They are recorded via an electronic braille keyboard similar to that of the Perkins Braille Writer. The information recorded on the tape is displayed to the user as a line of braille characters. Depending on the machine, this electronic braille display is presented as a line of either 12, 20, or 32 characters. The user reads at his own speed, pressing a switch whenever a new line of characters is to be displayed. Dr. Arnold Grunwald of Argonne National Laboratory is a tireless pioneer of paperless braille. There are two braille recorders available and a third promised by September. The Elinfa Portable Braille Recorder made in France by Elinfa, Inc. offers a 12 and 20-cell model. The two models are much improved over the earlier 12-cell model. The recorder measures 2 1/4 x 9 x 10 1/2 inches. The price of the 12-cell display, as of this writing, is \$3,000.00 and the 20-cell display is \$3,500.00 including shipping.

The Braillocord BRS 76 is a reading and writing device that offers a 32-character display. The BRS 76 was developed at the Heinrich-Hertz Institute for Communication Technics manufactured by AID ELECTRONIC. Unlike the Elinfa, the BRS 76 is a modular system and not so portable. The tape recorder and braille module are separate units that are mated together to enable the braille impulses to be recorded on the cassette. A reel-to-reel unit can be used for longer passages. The braille module measures 14 x 5.5 x 13 inches and weighs 15.4 pounds. At the time of this writing the price was not available.

Telesensory Systems, Inc., is developing a braille record which they promised to deliver in September 1979. The Versa Braille measures 9 x 14 x 3 3/4 inches high. It will have a 20-cell display, audio record and playback and rechargeable batteries. This unit also has a micro-processor that permits text editing and search capabilities for locating information stored on the tape. The projected cost of the Versabraille is \$4,000.

Some of the common features of the braille recorders are; (1) they record and play back braille and audio; (2) they can store up to 400 pages of braille on one cassette; and (3) they have index and search capabilities. The latter feature enables the user to locate pages on a cassette. The Elinfa has fast and slow search

features that use a braille tape counter to locate passages. The BRS 76 and the Versa Braille use a microprocessor to accomplish an automatic search. The reader indicates the page he wants to read by entering the information on the keyboard. The tape is advanced or reversed to the desired page. Also, these units can be interfaced with other hardware. For example, it is possible to mate a braille recorder with a typewriter equipped with the proper interface. The user inputs braille using the electronic keyboard. Simultaneously, the typewriter will type the corresponding print character. The text can also be typed automatically from the previously recorded tape. The reverse can also be done. A braille recording can be made from the text being typed on the typewriter. Connected to a computer, the blind programmer can send or receive data from the computer. Printouts can be read on the braille display of the recorder. Calculators supplied with the proper adapter can be mated with the braille recorder.

The braille recorders can serve a variety of applications such as silent notetaking for the student or business person, pleasure reading, personal letterwriting and keeping records and phone numbers. They can also be used as educational aids in school setting.

### Terminals

The computer system largely consists of devices called peripherals. These peripherals enable the user to communicate with the computer. The keyboard, similar to a typewriter keyboard is used to input information into the computer. Information is displayed on a Cathode Ray Tube (C.R.T.) similar to a television. A hard copy printout is also available, when a printer terminal is interfaced with the computer.

Until now, the computer programmer had to rely largely on his sighted coworker or reading machine to read the output from a computer. The person who developed the skills to use the Optacon or Stereotoner was often frustrated by the poor quality of the printout. There are now three different terminals available that enable a blind or visually handicapped person to read the output of a computer, and thus function much more independently. Braille terminals such as those available from Triformation Systems, Inc., and the Sagem Printer can be interfaced with computers and other information processing equipment to produce a braille hard copy.

The BD-80 manufactured in Germany by K.-P. Schonherr offers a braille terminal with 80 braille cells arranged in two rows of 40 cells each. The BD-80 uses a memory so that when a typewriter is interfaced, the user can perform text editing. It can also be connected to a CRT and other computer terminals. All these terminals will output Grade I braille unless a Grade II translation program is programmed into the computer.

For low vision users, ARTS Associates offers a large print video terminal. This input/output terminal offers eight foreground and background colors and three sizes of print, up to 1 1/2 inches high.

Talking terminals are yet another alternative that permits reading a computer output. So many organizations have promised to design full word talking terminals that we cannot catalog them all. We know of three speech terminals that are available.

The Maryland Computer Services has a spelled speech terminal built into a Hewlett Packard 9825 microcomputer. It can also be used as a talking telephone directory and for word processing. Triformation Systems, Inc., offers the Free Scan Speech Terminal that produces spoken letters instead of the printed symbols. The user operates a keyboard to locate the desired information to be read. C.Y. Suen of Concordia College, Montreal, Canada, sells a spelled speech terminal as part of their talking typewriter.

Current prices can be obtained by writing the manufacturer.

### Speech Compressors

For some people, aural reading has been the fastest method to process information. However, the main problem has always been the inability of the user to control the rate of the presentation. For years people have tried to speed up recordings with the result being a distorted speech sounding like "Donald Duck." This distortion can be tolerated at 1.5 times normal speed, but for most people it becomes unintelligible at greater speeds. Speech compressors have given us the ability to increase the speed of the tapes up to three times normal speed and eliminate the distortion. This can result in less time spent reading while processing the information at least as well as with normal rate recordings. Speech compression reduces boredom and inattention.

As of April 1979, there were five speech compressor units that we have evaluated and recommended for consumer use. These units include the Varispeech II by Lexicon, Inc., the A7 Speech Controller by the Variable Speech Control Co., the APH recorder with speech control module from the American Printing House for the Blind, the TCS Cassette recorder from Science for the Blind and the AmBiChron Pitch Shifter distributed by Mr. Richard Koch. Some typical features of speech compressors are: (1) they are A.C. powered; (2) they make uncompressed recordings; (3) they have complex electronic processors, and (4) they will expand or compress in the playback mode with the result that their pitch and voice quality will sound normal without regard for their playback speed. They compress up to three times normal recorded speed enabling people with about 10 hours of practice to read up to 400 words per minute.



Like a doctor's prescription, the speech compressor is a combination of ingredients. The two most important are the variable speed control and the pitch corrector that eliminates the distortion (Donald Duck) of the speeded-up tape. One can purchase a cassette deck that employs the variable speed option and the pitch corrector built into one unit, or a separate pitch corrector that can be mated to players or phonographs equipped with the variable speed control option.

If you are in the market for a speech compressor, the first decision you must consider is your reading needs. Do you read for pleasure? How many hours per day? Do you need to do recording as well as playback? Do you need four track capability? How fast do you want to read, 1.5, 2.5 or 3 times normal speed? After listing your needs, how then do you choose a speech compressor? These general guidelines may be followed. For pleasure reading the Library of Congress cassette player or talking book players are adequate. These units are for playback only and have variable speed control. Tapes can be played back at 1.5 times normal speed. Since these units do not have pitch correctors, the players can be mated to either the AmBiChron pitch shifter or the APH speech control module to produce compressed recordings. Since the LOC players are free of charge to those eligible, purchasing the pitch corrector is relatively inexpensive.

If you are going to purchase a cassette recorder rather than, or in addition to, the cassette or disc player available from the L.O.C. network, you may want to seriously consider the player/recorder available from A.P.H., the TCS recorder from Science for the Blind or the Varispeech II by Lexicon. The A7 Speech Compressor is suitable but will only accommodate two track recordings. Portability, rechargeable batteries, quality of the playback and features, such as indexing and pause controls should be considered. The consumer must make a thorough analysis of his/her reading needs. No speech compressor combines the features of the smaller decks and the high quality of the Lexicon. If you read for pleasure and are not interested in recording, the L.O.C. player mated to a pitch corrector is the least expensive unit available. For those who do a moderate amount of listening and recording, the SFB, APH or A7 units are adequate. If you are a college student or your job requires many hours of reading, choose the Varispeech II.

### Calculators

One result of the technology explosion of the 1970's has been the braille and spoken word output calculators designed for the blind and visually handicapped. These calculators have given the user the ability to perform mathematical calculations with speed and accuracy.

As of January 1979, several calculators were available from companies in the United States as well as abroad. They are the

(1) Braillatron Calculators, produced in Germany by the Schonherr Company; (2) the Calcu-Tac Braille Calculators, available from Science for the Blind; (3) the Speech Plus Talking Calculator from Telesensory Systems, Inc., and (4) the ARC 9500 Talking Calculator from Master Specialties, Company. Calculators can be classified into two categories, type of output and functions available with the device. There are two types of outputs, braille and spoken word.

The audio output calculators use a programmable computer chip to generate a synthetic full word spoken output. The braille output is available in two forms, either a paper tape in which the braille is embossed for a permanent record or a series of electronic braille cells in which protruding pins transfer the data to the user.

The Braillotron consists of a 9 or 14 cell module connected to a Texas Instrument Calculator. The user can purchase the calculator to match his math needs. The prices range from \$700.00 to \$1,200.00 depending on the type of calculator chosen.

Science for the Blind offers three braille output calculators. The Calcu-Tac T8A and T8AP incorporate the Monroe business calculator mounted to a paper tape display. The T8B uses the Kingspoint 44 scientific calculator. The printer uses a one-half inch wide paper tape on which the answer is embossed. Prices range from \$835.00--\$1,190.00.

The Speech Plus Calculator from T.S.I. offers the four basic functions in addition to percent and square root. It is available in German, Arabic, French and English outputs. Price, \$395.00.

The ARC 9500 is a talking calculator, available from Master Specialties, Inc. In addition to square and reciprocal, the 9500 will perform the same mathematical operations as the Speech Plus. This desk top unit costs \$495.00.

All the above calculators are provided with cassette or braille instructions and learning to use the calculators is relatively simple. The talking calculators are easy to use and give the user immediate verification of the number entry. This output is preferred by most users. The user needs little familiarization to understand the synthetic speech of the talking calculators.

For those who need to do advanced mathematical problems, the talking calculators are not adequate. However, there are several braille output calculators available that will solve most of the problems that are encountered.

There are other calculator systems available that can produce a braille or audio output. One such system is the Elinfa portable braille recorder developed and manufactured in France by Elinfa Inc. Once connected, such calculators may be operated by their own keyboard or that of the Elinfa. Calculations that appear in braille on the Elinfa display, appear simultaneously on the calculator's visual

display. Calculators such as those manufactured by Hewlett Packard and Texas Instruments can be supplied with an adapter for use with the Elinfa. The cost of the modification of the calculator is \$450.00.

Elinfa also manufactures a braille calculator employing the same display as the Elinfa recorder. It can be ordered with Hewlett Packard and Texas Instruments calculators. The price is \$1,150.00.

Another system that employs a calculator with a spoken word output is the Kurzweil Reading Machine desk top model. The calculator uses the same keyboard as the reading machine. Only a software tape programmed to do mathematical calculations is needed. In addition to the four basic functions the calculator will perform scientific calculations.

### Conclusion

The advent of microelectronics and the computer are revolutionizing communications generally. But, limited funding is available to harness this technology for blind people. Almost every project in the past has contributed something of value to the cause. The job can be done, but it is happening at a snail's pace.

We need two things. First, we need to study the lessons of the past that are all too often forgotten as unsuccessful projects are scrapped. Our second need is for an era of cooperation--cooperation between developers, manufacturers and sponsors. No single firm or government agency has the necessary technology or resources to build a good reading aid, braille system or computerized library service. History provides us with many horrible examples, one of which is close to home. For a century before the braille system was standardized, the proponents of several competing systems fought what has been called the war of the dots. Since it was waged at the expense of utility of the braille system for blind people, it was blind people who finally put an end to it.

Now, another battle is taking shape. We could call it the war of the components or the battle of the helpful robots. The field is wide open for competition in performing useful service. Let us cooperate by sharing technology. With cooperation, in several years, we can provide appliances for the people who need them. With cooperation at its present low level, the job could easily take 20 years. We hereby invite consumer organizations and consumer-oriented agencies to study carefully this complex situation and take appropriate action.

For more information about the equipment discussed in the article write:



#### TAPE PLAYERS/RECORDERS

A.P.H. Player/Recorder  
American Printing House for the Blind  
1839 Frankfort Ave.  
Louisville, Ky. 40206

A7 Speech Controller  
Variable Speech Control Co.  
2088 Union Street  
San Francisco, Cal. 94123

TCS Recorder  
Science for the Blind  
Box 385  
Wayne, Pa. 19087

Varispeech II  
Lexicon, Inc.  
60 Turner Street  
Waltham, Mass. 02154

AmBiChron Pitch Shifter  
Mr. Richard Koch  
67 Smith Street  
Lynbrook, NY 11563

#### CALCULATORS

ARC 9500  
Master Specialties, Inc.  
647 Babcock Street  
Costa Mesa, Cal. 92627

Speech Plus Talking Calculator  
Telesensory Systems, Inc.  
3408 Hillview Ave.  
Palo Alto, Cal. 94304

Braillotron Calculators  
Dipl.-Ing. K-P Schonherr,  
Schloss Solitude 3  
Technologieforschung in Medizin und  
Rehabilitation Stechnik  
D-7000 Stuttgart-1 Tel. 0711/694327

#### PAPERLESS BRAILLE

Versa Braille  
Telesensory Systems, Inc.  
3408 Hillview Ave.  
Palo Alto, Cal. 94304

Elinfa Portable Braille Recorder  
Elinfa Inc.  
Suite 1114, 725 K Street, NW  
Washington, D.C. 20006

Braillocord BRS 76  
AID ELECTRONIC GmbH, Berlin  
Wilhelm von Siemens-Strasse 16-18  
D 1000 Berlin 48

#### TERMINALS - BRAILLE-TALKING

Large Print Terminal  
ARTS Associates (Peter Duran)  
80 Boylston Street, Suite 1260  
Boston, Mass. 02116

Free Scan Speech Terminal  
Triformation Systems, Inc.  
5420 Bay Center Drive, Suite 202  
Tampa, Florida 33609

Sagem Printer  
Telesensory Systems, Inc.

Talking Terminal  
C.Y. Suen  
Concordia University  
1455 De Maisonneuve Bldg. West  
Montreal, Quebec H3G 1M8

Maryland Computer Services, Inc.  
Thomas at Bond  
Bel Air, Maryland 21014

BD-80 Braille Terminal  
K-P Schonherr  
Schloss Solitude, Haus 3  
D-7000 Stuttgart 1

#### READING MACHINES

Kurzweil Computer Products  
33 Cambridge Parkway  
Cambridge, Mass. 02142

Talking Optacon  
Telesensory Systems, Inc.  
3408 Hillview Ave.  
Palo Alto, Cal. 94304

## THE MULTIDISCIPLINARY APPROACH TO BLIND REHABILITATION

*The motivation for this paper stems from the authors' concern with what they recognize as a strong commitment to integration in current educational and rehabilitational work "for the blind." They also recognize that this commitment has certain consequences that may be negative and unnecessary. Their intention is, then, to enquire "into" integration so as to uncover those buried assumptions that make integration possible in the first place, i.e., giving integration its life. Further, they intend to examine in detail those consequences that a commitment to integration forces one to accept. Finally, they propose an alternative version of integration that, in their view, is based on assumptions that are more sound and result in more positive consequences.*

### GIVING LIFE TO INTEGRATION

by

Rod Michalko  
Department of Anthropology and Sociology  
University of British Columbia  
Vancouver, British Columbia, Canada V5W 1C6

and

Robert F. Mercer  
Executive Director  
The Canadian National Institute for the Blind  
British Columbia-Yukon Division  
Vancouver, British Columbia, Canada V5W 1C6

### Introduction

The education of blind children has, for a long time, been a source of concern for their parents as well as for a wide array of professionals, including educators, social workers, psychologists,



sociologists, and the like. In modern times, this concern has not waned despite the advent of varied conceptual developments and technological developments in the field of education generally and in the field of education of blind children specifically. In fact, it is this overwhelming and overpowering concern for the education of blind children that has provided the impetus for the growth and establishment of fields such as "special education" as well as the growth and establishment of professional and university programs designed specifically to train people to become teachers and rehabilitators "of the blind." And, interestingly enough, the development of such training programs has not alleviated the concern, or the problem, of how to educate blind children. Instead these programs feed on this problem--the very problem they seek to alleviate--for their generation and maintenance.

The debate regarding educational planning for blind children draws upon a particular resource for its liveliness, namely, "integration." Whether or not blind children should be educated within an integrated educational system or a segregated educational system or some mixture of the two, provides the fuel for the fire of debate that currently exists; a debate that is carried on among parents, educators, social scientists, and legislators. In short, it is the concept of integration that provides for the possibility of this debate. And, it is the concept of integration that provides for the cogency of this debate within the area of educational planning for blind children.

For the most part, discussions about integration<sup>1</sup> as well as the body of literature that has been accumulated concerning the concept, take integration for granted as a commonly understood phenomenon. Typically, integration makes the beginning of such discussions and these discussions forge ahead, so to speak, to say something about integration. This sort of policy puts integration in the background and, in this sense, it gets lost and forgotten and inquiries become inquiries "about integration" and not inquiries "into integration." It is true that in various discussions and investigations the concept of integration is operationally or ostensibly defined. But, such defining presupposes that those who will confront this definition also know what integration is. In short, to define any concept presupposes a knowledge of that concept.

In what follows, we intend to inquire into the notion of integration itself. Thus, like most discussions and inquiries we too begin with the notion of integration. However, our intention is to reverse the inquiry process, i.e., rather than beginning with integration and forging ahead, we intend to begin with integration and methodically move backward. Thus, we intend to examine and explicate some of the tacit, taken-for-granted assumptions and pre-suppositions that are implicitly invoked in any discussion about

---

<sup>1</sup>We take it that readers are familiar with this discussion as well as with the literature on integration.

integration. We intend, then, to do a sort of "excavation work." Our intention is not to forge ahead but to go backward in order that we may address the assumptions that ground integration, that provide for its very possibility, that make integration a sensible and reasonable thing to talk about, in a word, to uncover those assumptions that bring integration to life.<sup>2</sup>

Our belief is that the 1980's should be a decade of rethinking. It should be a decade of looking back and rethinking some of our policies, programs, and work that are directly concerned with, and affect, the lives of blind children. For us, rethinking means to stop and reflect upon what we have done in the name of, for, with, and to blind children and how we have done it. We contend that this sort of rethinking is not only crucial but necessary for the development of sound educational programs for blind children. Our intention, then, is to stop being "busy" for a moment and to reflect upon what it is we are "busy doing."

In presenting our inquiry into integration, our discussion will take the following form: first, we will present an elliptical sketch of what is typically understood as integration and what some of the assumptions for such an understanding are, secondly we will present our framework for a different understanding of integration, and finally, we will briefly discuss some of the policy implications that our framework generates.<sup>3</sup>

### The Typical Understanding of Integration

This section is not intended as an historical representation of the development of integration from some arbitrarily locatable historical period to the present, if by history is meant a review of such a development.<sup>4</sup> Such a project would presuppose a taken-for-granted understanding and knowledge about integration and our intention, as we have mentioned earlier, is to uncover these presuppositions rather than to make tacit use of them. Instead, in this section we will attempt the beginnings of an analysis of the assumptions and presuppositions that the use of the concept of integration covers over.

We suggested in our introduction that it is possible to provide an ostensive definition of integration and that such definitions do indeed exist. As a starting point, then, we will begin by taking

---

<sup>2</sup>The inquiry process is derived from McHugh, et al., 1974.

<sup>3</sup>When we speak of "blindness" we are speaking of it in an analytic way and not in a concrete way. Our purpose is not to define blindness, but to examine the conception (analytic) of blindness that integration demands.

<sup>4</sup>Many such reviews are available, and again we take it that readers are familiar with the literature.

a close look at one such ostensive definition. Lowenfeld suggests that for his purposes he defines integration as "the mutual acceptance based on equality of opportunity and before the law, between and among groups and individuals who differ in some important characteristic, may it be racial, religious, physical, economic, or otherwise" (Lowenfeld, 1975: 85).

What we have from Lowenfeld, then, is an ostensive definition or operationalization of the concept integration. Now, we may accept or reject this definition, find it to be adequate or inadequate, understand it as correct or incorrect, or submit it to any number of evaluative procedures. Whether or not we accept or reject Lowenfeld's definition depends upon whether or not we find it useful, and whether or not we find it useful depends on our purposes. Whatever our enterprise is, will in this sense, determine whether or not we accept Lowenfeld's formulation.

But, irrespective of whatever evaluative operations we may choose to perform on Lowenfeld's formulation, one thing remains strikingly clear and obvious, namely that what we do accept is that Lowenfeld's definition is a definition of integration. That is, we do not read Lowenfeld's definition as a definition of some other phenomenon. We recognize that what Lowenfeld is defining is integration. And, this recognition--this knowledge--is something that did not come from our reading of Lowenfeld's definition but is something that we bring to that reading. In short, in order to read a definition as a definition of integration, we must already possess an understanding of what would amount to such a definition.

Suppose, for a moment, that Lowenfeld's definition of integration would have read as follows: "Integration is the phenomenon characterized by a visual acuity of less than 20/200 in the better eye after correction or a visual field of less than 20 degrees in the better eye after correction." What sense would we have made of this definition of integration? Would we have entered into debate about whether or not this definition of integration is useful or adequate? No. We would have suggested that this definition is not a definition of integration at all, but a definition of some other phenomenon, for example, blindness. And, this decision can only be made on the basis that we already know what integration is and "can recognize it when we see it defined."

Before entering into a more detailed discussion with respect to the tacit assumptions that make the concept of integration possible, it will be instructive to examine somewhat more closely, albeit briefly, Lowenfeld's formulation of integration. The first thing that strikes us about Lowenfeld's definition is that he conceives of integration as "mutual acceptance . . . between and among groups and individuals who differ." Now, what does this "mutual acceptance" ask for? It asks for nothing less than what may be called "community." It asks that we conceive of difference as an irrelevant feature of the lives of individuals and groups even though these differences are, in Lowenfeld's words, "important." And, it is the rejection of



difference as an irrelevant feature of life that provides for the socially organized production and maintenance of community. (More will be said on community later in this section.)

Another interesting feature of Lowenfeld's definition is that he conceives of "mutual acceptance" as something ". . . based on equality of opportunity and before the law. . . ." Clearly, when Lowenfeld speaks of "equality of opportunity" guaranteed by legislative authority, he is not recommending that blind persons should have an "equal opportunity" to be sighted or that sighted persons should have an "equal opportunity" to be blind, or that men have an "equal opportunity" to be women and vice versa, or that blacks have an "equal opportunity" to be white and its opposite. Nor, presumably, is Lowenfeld recommending that "equality of opportunity" means that sighted persons have the "equal opportunity" to be exposed to the social stigma suffered by some blind persons, or that men have the "equal opportunity" to suffer the oppression experienced by some women, or that whites have the "equal opportunity" to experience the denigration that is the lived experience of some blacks.

But what does Lowenfeld intend by the phrase "equality of opportunity?" Wherein lies its sensibility and reasonableness? In order to render "equality of opportunity" reasonable and sensible, we must tacitly invoke taken-for-granted, commonly understood notions about "inequality." And, it is these notions about inequality that Lowenfeld relies on--presupposes that his readers have--for the sensibility of his phrase "equality of opportunity." Lowenfeld presupposes that we will understand that there are some individuals and groups in our society ". . . who differ in some important characteristic . . ." and that inherent in these "important differences" is inequality. Furthermore, Lowenfeld assumes, and assumes we assume, that individuals and groups that can be legitimately charged with difference and inequality are individuals and groups that display certain racial, religious, physical, and economic characteristics. Thus, Lowenfeld distinguishes certain individuals and groups as "different" and whose "equality" depends for its manifestation on legislative authority. This definition of integration, then, suggests that integration is the procedure whereby "difference" is turned into "sameness" (equality) and it is in this sense that integration is the "production of community."

Although a superficial reading of our analysis of Lowenfeld's definition of integration will lead to the conclusion that our intention is to criticize Lowenfeld, nothing can be further from the truth. Our choice to present such an analysis of Lowenfeld's definition of integration stems from two motivations: (1) it is a way to begin our "excavation work" on the concept of integration and (2) we begin with the "best in the business," i.e., we begin with the author who has provided more insight into the education of blind children than anyone else in modern times. The analysis of Lowenfeld's definition is a way for us to display our understanding of an inquiry "into integration" and displays the explicative tone that we employ in the remainder of this paper. We turn now to a discussion of integration

as it is located within the typical understanding of education for blind children.

The rationale provided by those who advocate integration for blind children runs something like the following: Blind children are morally and legally entitled to have an equal opportunity to education, where equal opportunity refers to an opportunity for blind children to attain the same quality and quantity of education to which their sighted peers have a moral and legal right. Furthermore, the rationale suggests that if blind children attend the same schools as do their sighted peers, they will be steeped in the "realities of the sighted world" and that life in such an environment will facilitate and greatly enhance blind children's acquisition of understanding and knowledge of the sighted world and the skills necessary to function adequately and appropriately in that world. Conversely, the advocates of integration argue that segregated educational systems for blind children, namely schools for the blind produce and foster a lifestyle that is neither appropriate nor acceptable in the "sighted world," the world that the blind child will eventually confront. Thus, according to this rationale, the sooner a blind child confronts the sighted world, the more readily will he/she adjust to that world.

A commitment to integration brings with it some surface and concrete consequences and considerations. First of all, there is the consideration of the status of the educational system into which the advocates of integration would have blind children plunged. In recent years, there has been a growing body of literature<sup>5</sup> that suggests that this educational system does not permit the creative growth and development of its students. In fact, this literature suggests that the educational system promotes non-creative, uninteresting and meaningless thought. In short, critics of the educational system argue convincingly that the last place to look for the activity of "learning" is in the schools of our society. Even though this is, to say the least, an extreme position, there has been, to our knowledge, no effective rebuttal to this argument. And, it is into this educational system that advocates of integration suggest we place blind children. Of course, the argument that the educational system fosters non-creativity and non-learning may be rejected. But, that the argument has at least some credence is surely the case. And, if this is admitted then we must at least think about some of the consequences it would have for blind children. The question becomes: Do we want blind children to be educated in a system that discourages and even stifles any creative potential that these children may possess?

Another consideration that integration commits us to is the question of curriculum. It is commonly held that blind children do not acquire an understanding and knowledge of the sighted world "naturally." It is argued that whereas sighted children "naturally," that is to say, implicitly and covertly come to learn about the sighted world, blind children must acquire this knowledge explicitly

---

<sup>5</sup>For example, see Neill, 1960; Rogers, 1969; Holt, 1964, 1969; Graubard, 1972.



and overtly, i.e., they must be taught the "reality" of the sighted world. Because it is assumed that sighted children "naturally" come to appropriately recognize the various objects in the world such as trees, buildings, other persons, and the like. Also, because it is commonly understood that these children "naturally" acquire the ability to produce appropriate talk and conduct, i.e., appropriate "sighted talk and conduct," relatively little explicit attention is given to this area vis-a-vis curricula. For example, curricula do not include areas such as mobility and orientation, social skills or courses specifically designed to enable students to acquire and develop the recognition and understanding of such concepts as "around the block," "spatial relationships," "height and depth," and so on.

A commitment to the integration of blind students immediately renders the formulation of curricula problematic. Because children are blind it is assumed that they have little or no direct, firsthand knowledge and understanding about many aspects and characteristics of the "sighted world." Furthermore, the knowledge that blind children have about the sighted world is typically understood as incomplete and inadequate. Thus, it is conventionally held that in order for blind children to be successfully integrated, curricula must be enhanced, elaborated and augmented to include areas such as mobility and orientation and concept development. This problematic nature of curricula that is produced by commitment to integration, is the source of many debates and discussions. Such debates, often heated, center around issues such as what sorts of skills should blind children learn", which visual aids are most appropriate?, at what age should cane travel instruction begin?, who, or what agency should teach these skills?, and so on, ad infinitum, and indeed, ad nauseum.

So far, we have discussed some of the concrete consequences of adopting an integrationist point of view. Further, we have also implicitly pointed to some of the background assumptions that are necessary in order for integration to take on a life of its own, i.e., in order for integration to become a reality. We can formulate the consequences of a commitment to integration discussed so far as "surface consequences." Our task is now to turn to a discussion of what we will call "deep consequences" that emerge and are necessary for us to adopt in order to commit ourselves to a notion of integration, i.e., when we recognize integration as a reality. In other words, to speak, write, and, indeed even to think about integration presupposes that we have tacitly committed ourselves to understanding the world in a particular way that necessarily results in certain kinds of consequences.

What sort of understanding of the world supports and makes possible the notion of integration? Starting at rock bottom, the notion of integration commits us to understand the world as objective and there "for anyone to see." We must understand the world as existing objectively and separately from us, i.e., as "just there." The reality of the world has nothing to do with us, it exists in and of itself, and we possess a physiological mechanism, in the form of our sense organs, as a means to perceive that world. True, our



individual intentions, motivations, purposes, and the like, do affect the way we "see" the world. For example, a tree is understood differently depending upon whether we are environmentalists, botanists or artists. Regardless of these various points of view, all agree that a tree is a tree and all recognize a tree as a tree when they see it.

In fact, a commitment to understanding the world as stable, objective and ordered permits us to account for the actions of certain individuals. We make the assumption that the world is "just there" for anyone to see and that all of us see it in essentially the same way. Thus, when someone claims to see the world differently not only do we account for this difference, but we must account for this difference. Thus, the version of the world that supports integration cannot tolerate difference. It can only have a community of perceivers who understand the world in the same way that everyone else understands the world and this is what we mean when we speak of community. For example, if someone told us that the tables and chairs in their house consistently rose and floated around the room we would have to account for this perception. We would understand this phenomenon as "not the way the world is." Several accounts can be used to render this phenomenon sensible and thus to maintain community, i.e., the person is seeing things, the person has been working too hard, the person has been reading too many ghost stories, or the person is crazy. Or, suppose we see someone walking down the street bumping into posts, people, and so on. What are we to make of this? We might suggest that the person is drunk, or that the person has consumed hallucinogenic drugs, or instead of seeing the person as "blind drunk" we may see that person as simply "blind."

All of us can generate a long list of examples. The point is, however, that a commitment to integration commits us to understand the world as real and objective and as "just there" for anyone to see. And a notion of integration also commits us to understanding the world as perceivable to everyone in the same way. In other words, how and what we see is how and what anyone else sees. And, once again, this is what we refer to as community. And, that is why we suggest that this sort of understanding of the world cannot tolerate difference but must rid the world of that difference in order to maintain community.

But, what sort of consequential commitment does this have for our understanding of blind persons? We understand that blind persons do not "see" the world in the same way everyone else does. They do not possess a correct or adequate perception of the world. Integration commits us to understand that those perceptions of the world that blind persons have are wrong, incorrect, inadequate, false, defective and distorted. A commitment to integration does not permit us to accept the blind person's perception of the world. It is defective and distorted and we must change it. We must convince blind persons that what they "see" is not the way things really are. The first thing we must do to a child who is born blind, then, is to coax that child into denying his/her own perception and experience

of the world and to accept some other perception and experience as "real." Is it possible that this denial process is the source of much confusion and frustration for the child?

With these commitments, we also come to understand that a blind child will not learn what the world is "really like" if he/she is placed in an educational environment where his/her peers are exclusively blind. Crudely put, the theory runs as follows: piling distortion upon distortion only fosters distortion and does not do anything to rid the child of this distortion. It is community to which we are committed and not difference. Thus, integration!

Before outlining our framework, there is one final issue we would like to raise with respect to a typical commitment to integration. We have pointed out that a commitment to integration commits us to a notion that we must explicitly teach blind children about the world and how to interact in it. This teaching typically takes the form of orientation and mobility instruction, concept development, and the like. In teaching the child how to orient to the world and of what the world consists, we are simultaneously, in an implicit way, telling the child to deny his/her own experience of the world and to accept ours. We are telling the child that what he/she "sees" is "unreal" and that what we "see" is "real." In mobility training, for example, we teach blind children that the sun may be used as a device to recognize direction, that trees and signposts can be used as landmarks, how to recognize traffic flows and curbs for safe mobility in busy streets, how to be properly guided by sighted persons, and so on. In short, we teach the blind child to relate to the world technically. The skills we teach blind children, whether they be social skills or orientation skills, are taught technically and our version of the "good blind child" is one who can reach a certain level of skills acquisition and a certain level of technical competence in employing these skills. What we are producing are technicians.

Now it is not our belief that such skills should not be taught to blind persons and that they should not be technically competent in these skills. Our point is that there is more to a person, whether they are blind or sighted, than technical ability. Think of how educators and rehabilitators talk about blind children. In a sense, they are characterized as "good" if they are technically competent at social and orientation skills and are characterized as "bad" if they are not competent at these skills. In short, the talk about blind children, for the most part, centers around their technical competence. Is this the way we talk about sighted children? Do we like or dislike a person or choose our friends on the basis of whether they are technically competent or on the basis of some other version of what a "good person" is? Do we think that the acquisition of skills will make a blind child "good?" What about all those children that are locked up in jails for juvenile delinquents who already have many of the skills we are busy teaching blind children?

Now, we do not disagree with teaching skills to blind children. In fact, it is an absolutely necessary process. But, is that it?

Would Michelangelo have been the sculptor he was if he was only technically able? Were there not, and are there not, many persons with Michelangelo's level of technical competence? Clearly, it takes more than technical competence to be a great sculptor or a great musician. And, it takes more than technical competence to be a "good person." It may be argued that educators and rehabilitators of blind children only have the responsibility and obligation to teach technical skills and that facilitating the development of "goodness" in the blind child is the responsibility and obligation of the family or the responsibility and obligation of the blind child him/herself. But, we should not kid ourselves. In promoting the production of technicians we do not merely have education or rehabilitation, but rather we have "moral education" and "moral rehabilitation." With the advent of the technological age we as teachers and rehabilitators of the blind buy into this technical way of relating to the world and to others and, whether we realize it or not, we promote this technical way of relating to the world as a "moral good."

In summary, the preceding discussion was intended as the beginnings of an analysis of the assumptions and presuppositions necessary to support the notion of integration. It will be useful to characterize the above discussion in a more succinct form. Integration as it is typically conceived relies for its life and is supported by the tacit understandings that:

1. The world is an objective reality and is "just there for anyone to see."
2. The world is "just there for anyone to see" provided they have the proper mechanisms and attitudes for "seeing" that world.
3. Such a world cannot tolerate difference and must thus account for difference and these accounting practices result in the maintenance of the one true objective world, i.e., community.
4. Blind persons' perceptions of the world are distorted and defective.
5. In order that blind persons may interact appropriately in the world they must be taught the methods of such interaction.
6. Blind persons must come to understand that the world they perceive and experience is not real and that the only real world is the sighted world.
7. Integration is a metaphor for eliminating difference and producing community.
8. The good blind person is the good technician.

Now that we have depicted the typical and conventional understanding of integration, i.e., now that we have begun the "rethinking"



process, our task may be considered complete. However, our rethinking integration also has consequences and the following section will devote itself to a discussion of some of these consequences.

### An Alternative Conception of Integration: The Blind Person as Stranger

The last section was devoted to an explication of the typical and conventional conception of integration. In this section, it is our intention to present a brief outline of what we consider to be an alternative conception. It is important to note here that our alternative conception is in its initial stages. Thus, the ideas presented here are necessarily incomplete. We intend this paper as an opportunity to formulate our views, incomplete as they may be, as a means for making it possible to concretize and work out our conception. Since all rehabilitation and educational practices are grounded in theory, even though in most cases that theory is not explicated, this section will begin with a brief examination of our theoretical perspective.<sup>6</sup>

As in the case of the conventional conception of integration, we too conceive of the world as an objective, ordered reality. We conceive of the world as an objective reality containing objects, scenes, activities and events. In short, we too conceive of the world as "just there." But, it is at this point that our conception of integration departs from the typical and conventional conception of integration.

Whereas the conventional view holds that the world is "just there" and that this "just thereness" has nothing to do with us, we hold that the "just thereness" of the world has everything to do with us. In other words, it is our activities in the world and our relationship to it that, in a sense, "accomplishes" the world as being "just there." To see the world as an objective reality requires that we do, what might be termed, "interpretive work." This interpretive work consists in making several assumptions about the world and about one another in order to see it as objective and as "just there." For example, as mentioned previously, we take it for granted that what and how we see is what and how others see. In other words, we react and interact with our assumptions of a "definitive reality." And, anyone who acts as though this reality were not real is subject to what we have called "accounting practices." That is, we account for anyone who claims that what he/she sees is what everyone else sees when we do not recognize this claim as real.

To illustrate, we may be standing next to someone in the street who, every few minutes, is pointing at something and saying "look at that." When we look we do not see what he is pointing at.

---

<sup>6</sup>Much of what follows derives from Phenomenology, Schutz (1973), (1971), (1967); Merleau-Ponty (1962); and ethnomethodological sociology, Garfinkel (1967).

But, someone has to be right. Our notion of a definitive reality forces us into accepting only that definitive reality and no other. In other words, it forces us to accept only one version of reality when more than one exists. Therefore, in the case of the man in the street, it is either we who are "not seeing things" or he who "is seeing things." In a similar way, we may characterize some persons as "hearing things," or as "seeing visions," or as "being crazy," and so on. This is one way we have of ensuring community, i.e., of "accomplishing" the objectivity of the world. Moreover, if we are to make a claim to bonafide membership in this society it is essential that we learn to produce and recognize those features of society that get counted as real and objective.

Think of an activity that concerns us in terms of orientation and mobility for blind persons. Ordinarily this activity is mundane and is taken for granted. It is so mundane and so taken for granted that we forget that we are doing a complicated set of interpretive procedures in order to accomplish it and to recognize its accomplishment. That activity is walking.<sup>7</sup> Even in the busiest thoroughfares, for example, people who are walking do not bump into one another. Or, we do not walk between people who are walking together. When we are walking with another person, or other persons, we are able to coordinate our activities so as to accomplish "walking together" and to have others recognize it as "walking together." When we stop and think about it, walking turns out to be not just a simple mundane activity but a set of complicated activities. Most likely we have all witnessed a small child walking down a sidewalk and walking between two people who are recognizably--to us adults--walking together. The persons walking together do not expect the child to say "excuse me" or "pardon me." They do not expect that the child has learned to do the interpretive work necessary to recognize "walking together." The child has not yet acquired the taken-for-granted methods necessary for recognizing "walking together" and, in this sense, children are not typically seen as bonafide members of society.

To take yet another example. It is often the case that children make use of household furniture as toys. They will make believe that tables and chairs are a submarine or that a coffee table is a boat and the like. Now, it is possible to account for these activities by invoking certain notions such as developmental stages. But, what we consider a more useful conception is to consider this activity in terms of the child not yet having fully acquired the tacit methods to "accomplish" table as table rather than as submarine.

Thus, it can be seen that we, as members of society, employ tacit methods and procedures for "accomplishing" the world as

---

<sup>7</sup>For an analysis of walking see Ryave and Schenkein, 1974: 265-278.



objective and employ these methods and procedures in a tacit way, to "accomplish" the objects, scenes, activities, and events of everyday life. One way to see the activities of children, therefore, is to understand them, in a sense, as ethnographers who, coming from a children's culture, are trying to get along in an adult culture. Ethnographers typically study cultures different from their own. They travel to exotic cultures with the intent of ascertaining how the culture works, i.e., of figuring out how to be a member of that culture. But, these ethnographers do not go to exotic cultures empty handed. They are equipped, albeit tacitly, with an understanding of their own cultures and make use of that understanding to interpret and make sense of the exotic culture. And, it is in this sense, that children are like ethnographers. They live in an exotic culture (adult culture) and try to figure out and make sense of that culture by the cultural equipment they bring from their own culture (children's culture).

Children are not the only ethnographers. All of us, at one time or another, do ethnographic work. For example, suppose that we are invited to what may be characterized as a "fancy dinner." And, suppose further that we have never attended such a dinner. We are seated at the table and we find displayed in front of us an array of tools. We are not sure which tool to use at which time. We do not know which fork or knife or spoon to use on which dish. What do we do? We watch someone until we know what to do. In other words, we copy someone. But, like the ethnographer, we do not come to this dinner empty handed. We already know who to watch. If there are children at the table, for example, we do not turn to them and watch them as a means of discovering which fork to use. We already have a tacit knowledge of, and know how to recognize, those persons at the table who seem to know what they are doing. In order to copy these persons, we must also have a prior knowledge of what copy means. For example, if we are not sure how to eat our soup, we may watch someone and copy him/her. But, one's sense of copy could be to do exactly what the person does. So, when the person takes his/her spoon and eats his/her soup, we may walk around the table to where he/she is sitting, take his/her spoon and eat his/her soup. This surely is a sense of copying. But, because we already know what copy means we are able to copy him/her, not in a literal sense, but in a practical sense. In other words, we do with our spoon and soup what he/she does with his/her spoon and soup. We copy him/her, in other words, for all practical purposes.

A final feature of the theoretical perspective we employ is that all members of society are continuously and constantly making sense of the world and of the objects, scenes, events and activities in that world. That is, we are constantly and continuously invoking common-sense, taken-for-granted knowledge and understandings about the world in order to make sense of that world and in order to "see" the world as objective and as sensible. For example, walking down the street we may encounter a person bending down. At a single glance we immediately make sense of that activity by invoking some tacit understanding and knowledge. We may make sense of that person's



activity by understanding it as "tying his/her shoelace" or, "looking for something" or, "picking up a coin." Typically, we do not ask the person what he/she is doing nor do we watch that person until we determine what he/she is doing. We invoke some sense-making notion in order to see that person's activity as sensible. In other words, we do not typically employ empirical tests to determine with some empirical certainty the nature of the person's activities. In this sense, it is enough for us if we find that person's activities to be sensible.

The theoretical perspective we employ may be characterized in the following way:

1. The world is objective, sensible and ordered.
2. We use notions of objectivity, sensibleness and orderliness to understand the world as such and, in so doing, we are inexorably involved in "accomplishing" the world as objective, sensible and orderly.
3. We are continually involved in sense-making procedures.
4. We are continually consulting the context of situations and one another to find the world and our activities as sensible, reasonable, and objective.
5. Members of society employ tacit methods and procedures for producing and recognizing a sensible, objective world.

At this point, and following our theoretical perspective, we may introduce the concept of "stranger." In one way or another, and at some time or another, we are all strangers. We may, for example, visit a foreign land. Being strangers in a foreign land means that we must, in order to act appropriately, determine what appropriate action is. We must discover how persons do things. And, we must discover how persons do the most mundane things. We bring with us a set of knowledges and understandings from our own land that we use to make sense of customs in other lands and that we also employ to determine how to do things in other lands.

Or, at the other extreme, all of us, at one time or another, have visited families in their homes. And, even when we visit other families in our own neighborhood we do a similar kind of sense-making. The practices that we follow in our own homes may be quite different from those followed in the homes of others and we orient to these differences in an attempt to act appropriately. For example, in our own home we may drink beer directly from the bottle whereas in the home of another it is probably the custom to pour the beer into a glass before drinking. Or, in our own homes we may begin eating dinner without saying grace whereas in the home of another grace may be said before each meal. Of course, we may refuse to drink beer from a glass or to say grace before a meal. But, such a refusal is often accounted for. For example, we may say "no thanks, I always drink the beer from the bottle" or, we may say "I am not a Christian and

therefore will not partake in grace." And, if we are prepared to accept whatever consequences may come, there is nothing preventing us from doing this. But, what we do means that we are able to recognize that these activities are appropriate in the homes of others.

In the conventional view of integration as depicted in the previous section, blind person's perceptions of the world were considered false and distorted. But, suppose we consider the perceptions of blind persons not as false and distorted but as representing a culture--the culture of blindness. Conceiving of blindness in this way makes it possible for us to conceive of blind persons as strangers in the sighted culture. And, as strangers in the sighted culture it is in turn possible for us to consider blind persons as trying to determine the customs and folkways of the sighted culture. And, in this sense, what education and rehabilitation of the blind amounts to is the teaching of sightedness. And, this is where educators and rehabilitators of blind persons have understandings of the world that are different from most persons. Most persons take our world for granted and take for granted the methods and procedures we have for getting along in our world. But, educators and rehabilitators of blind persons are trying to impart that world and those methods for getting along in that world to blind persons. Therefore, in a sense, they cannot take that world or those methods for granted.

Typically, however, educators and rehabilitators of blind persons do not view blindness as a representation of a different culture. They view blindness as a defect that produces a defective understanding of the world that must be corrected. And, correction amounts to trying to get the blind person to display a knowledge of the world--a knowledge of the sighted world. This is done in various ways. For example, attempts are made to teach blind persons to look toward the voice when they are speaking with someone. This activity is nothing more or less than a display of a knowledge and understanding of the sighted world. Typical views of blindness and integration often presume that blind persons have trouble adjusting to the world. Activities such as the rocking motion displayed by some congenitally blind persons are typically conceived of as problems. And, more than that, they are conceived of as problems that must be eradicated. To this end, various sorts of rehabilitation and educational programs have been developed.

Understanding some of the activities of blind persons as problems also generates some negative sense-making notions of blind persons. If, for example, blind persons do not comply with the norms and order of sighted culture, for example, by continuing to rock, it becomes possible to invoke all sorts of psychological, or even psychiatric, hypotheses to make sense of that activity. It may be suggested that the blind person has "not adjusted." In other words, if the blind person is not acting "sighted enough" he/she may be deemed as "not adjusting to his/her handicap," or, as "being developmentally slow," or as "not facing reality," and so on. If, on the other hand, a blind person is acting "too sighted" he/she may be characterized as



"not accepting his/her handicap." Some blind persons, for example, are reluctant to ask for help. If they do not ask for help in certain situations they may be thought of as being "too independent," or again as "not accepting his/her handicap." If, on the other hand, the blind person asks for help in other situations he/she may be understood as being "too dependent," or as "not adjusted to his/her handicap." Thus, there becomes a fine line that blind persons must negotiate in order to be seen as "good technicians." Moreover, this "fine line" is something that blind persons figure out for themselves from their interaction with educators and rehabilitators of blind persons.

The typical view of blindness and integration also suggests that the blind person's knowledge of the world is knowledge not worth having in that it is distorted and only interferes with the acquisition of the "right knowledge." But, like the stranger, the blind person brings all sorts of knowledge from within his own culture to make sense of the sighted culture. How else could a blind person learn the things that educators and rehabilitators attempt to teach? Take, for example, teaching a congenitally blind person to look toward the voice when speaking to another. Try writing out a set of instructions for doing this activity. We suggest that writing out a complete set of instructions for doing this activity would not only be difficult but impossible. For example, we instruct a blind person to look toward the voice when he is speaking with another. The blind person does so and comes back to us and says, "They said I was staring." We then say, "You shouldn't look toward the voice all the time, you must look away occasionally." The blind person then asks, "How often do I look away?" "Do I look away every second, every five seconds, every ten seconds?" How do we reply? Looking away at such precisely timed intervals would make the blind person look mechanical. We may suggest to the blind person that he/she look away from the voice only occasionally so that it "looks natural." But what does this mean? In a word, although educators and rehabilitators of blind persons are capable of providing the technical instruction necessary to produce "sightedness," the production of sightedness is something that the blind person will either carry off well or not. Whether he/she does so will depend not on his/her acquiring technical skills but upon how he/she uses these skills. And, that is why it is important not to teach blind persons technically.

If we refer back to our discussion about definitions and consider that we must have a preexisting knowledge of what is being defined in order to recognize its definition, a curious and interesting issue arises. Considering for the moment those persons who are totally blind, the issue becomes when and how it is they recognize sightedness when they are confronted with it. For example, when someone describes a visual phenomenon to a blind person, how is it that the blind person understands this description as a description of a visual phenomenon? Think of it this way. Suppose that a sighted person asks someone how to get to, say, the city hall. What this person is asking for is a description. And, the reason he/she is asking for such a description is because he/she does not know. But,



even when they do not know how to get to the city hall they do indeed know what a description of how to get to the city hall "looks like." Suppose that the person they asked for this description replied, "You blend two eggs together with a quart of milk and a pound of ice cream." Surely the person asking for a description of how to get to the city hall would not respond to this description by saying something like, "Thanks very much." However, it is entirely conceivable that they might say something like, "Are you crazy, that's not what I want to know." In this sense, then, the person already knows what he/she is asking, i.e., although he or she does not know the details the person clearly knows what a description of how to get to the city hall looks like and will not accept anything that he/she doesn't already know.

Conceived thus, it is interesting that whatever it is we do not know and, therefore, ask for this knowledge, we accept this knowledge only on the basis that it is something we already know. Many of us would claim to know nothing about thermonuclear physics. Some of us may even be motivated to enroll in a course on thermonuclear physics so that we may learn about it. But, suppose during the first lecture the instructor suggested that thermonuclear physics is the study of the poetic imagery displayed in Beethoven's works. Would the person who claims not to know anything about thermonuclear physics accept this as thermonuclear physics? Or, would he/she leave the lecture on the basis that the instructor did not know what he/she was talking about. And, how can anyone make this decision unless he/she already knows something about the issue that they came to study?

Although we should not get lost in our analogies, a similar process must operate with persons who are born totally blind. Clearly, they will not accept a description of sightedness unless that description makes sense to them. In other words, blind persons do recognize descriptions of sightedness based on the fact that they know and can recognize an adequate description of sightedness. In one sense, then, blind persons may be provided with the details of visual events but this sort of provision presupposes that blind persons will recognize these events as visual events.

Conceiving of blind persons as being strangers in a sighted culture yields a particular conception of blindness itself. This sort of conception of blindness differs radically from the conception of blindness presupposed within the conventional framework of integration. Recall that within that framework it was necessary to understand blind persons' perceptions of the world as distorted perceptions of the sighted world. In contrast, conceiving of blind persons as not being strangers presupposes that blind persons' perceptions are not distorted perceptions of the sighted world. Rather they are correct, adequate, clear, precise perceptions of the culture of blindness. This, we argue, is not only a more positive view of blindness than that of the conventional integration view, but this view also provides for a different understanding of integration.

It was our intention in this section to provide a detailed explication of our understanding of the world that enables us to conceive of integration differently from that of the conventional conception. Because this paper is committed to, and thus is an involvement with, rethinking the issues we have expressed so far are, to say the least, abstruse. And, we do not apologize for that. Rethinking our typical understanding of blindness often means that we must "turn our heads around," so to speak, and such turning typically eventuates in abstruse, sensitive, difficult and confusing issues. And, it seems to us, that this should be the case particularly when we are rethinking our work with blind persons. For, the nature of work with blind persons is such that it is abstruse, sensitive, difficult and confusing. And, now that we have outlined our conception of the world and our conception of blindness, it remains our final task to explicate briefly some of the consequences such views have for the concept of integration.

#### Some Considerations for Future Work with Blind Persons

It should be clear that by now we do not conceive of blindness as a merely physiological phenomenon. If this were the case, there would be no problems and blind persons would not find themselves in somewhat tenuous positions in society. The conception of blindness that reflexively springs from our discussion and that provides the impetus for most of our discussion is that blindness is a social phenomenon.

What we mean by blindness is a social phenomenon is that it can only be produced and recognized socially. The recognition of blindness--in whatever way it is formulated--turns on a tacit invocation of taken-for-granted notions about what it is to be sighted. Only by understanding what sightedness is can blindness be truly recognized. It is impossible, for example, to find a blind person by using vision tests alone unless the procedure used is to test everyone. Otherwise, try to imagine how one would go about finding a blind person by using a vision test. Who would be tested? In order to find blind persons by the use of vision tests it would be necessary to test only those persons who the tester understood as either being blind or as most likely being blind. In other words, the tester would tacitly invoke his/her own implicit understandings of what sightedness is and employ those notions to identify those persons who are most likely to be blind. This "finding," or the recognition of blind persons, evokes a belief that a person's actions are not the typical, normal, conventional, standard actions of sighted persons. It is in this sense, then, that blindness may be conceived of as a social phenomenon.

And, what do we say of sightedness, is this also merely a physiological phenomenon? We believe that it is not. Persons who are sighted must know how to produce sightedness in order to be taken as sighted persons. Despite their physiological apparatus for "seeing,"



persons must employ socially organized and tacit methods and procedures for producing sightedness, i.e., they must "look" like sighted persons. Think, for example, of those partially-sighted persons who are sometimes mistaken as being fully sighted persons. Indeed, there have been instances where totally blind persons have been mistaken for sighted persons. What do we make of this? To be recognized as sighted means that these blind persons were employing those tacit methods and procedures for producing sightedness. Thus, along with blindness, sightedness may also be conceived of as a social phenomenon. If not, what would be the status of our education and rehabilitation programs for blind persons? What would we teach blind persons? If blindness and sightedness were not conceived of as socially-organized phenomena, what would educational and rehabilitation programs for blind persons "look like?"

If we choose to commit ourselves to education and rehabilitation programs for blind children that are geared toward providing these children with the skills necessary to interact appropriately within the sighted culture, it seems imperative that future research in the area of blindness would deal, somewhat paradoxically, with sightedness. This apparent paradox, however, is alleviated once we conceive that what it is we are involved in teaching blind children is sightedness. If we view sightedness as a socially-organized set of tacit practices and procedures that members of society continuously and constantly employ, research should be designed to elicit these taken-for-granted methods for appropriately producing sightedness. And, this sort of research would require that we attend to the world differently. What this attention would amount to was discussed in an earlier section. But, unless research is geared toward the production of "ethnographies of sightedness" it will remain extremely difficult to teach blind children how to produce sightedness.

A crucial and important consequence of our conception of blindness, and thus integration, is that we address our responsibilities. It is typical for workers and agencies for the blind to conceive of blind persons' problems and needs as something external and separate from the workers and agencies. It is generally understood that the problems and needs that blind persons experience have nothing to do with agencies for the blind. The general understanding is that what agencies for the blind are responsible for is identifying and alleviating the problems of blind persons as well as identifying and meeting the needs of blind persons. Although Scott's (1969) work should have alleviated and dispelled such notions, they still exist.

Agencies for the blind, be they oriented to education or rehabilitation, take blind persons as the "objects of their work." And, since these agencies define their work, they must also define objects that are workable. Not everything that happens in the lives of blind persons is understood by agencies for the blind as problems or needs. The things agencies for the blind identify and understand as problems and needs are only those things that fit within their framework of thinking about blind persons. And, this sort of thinking stems directly from the conventional view of integration outlined in



an earlier section. When integration is conceived of as (a) the destruction of blind persons' perceptions of the world and (b) the replacement of blind persons' perceptions with the "correct" perceptions, the understandings of what blind persons' problems are and what needs blind persons have are extremely limited and restricted.

We are not suggesting a quick answer or a quick alternative to this problem. What we are suggesting is that educators and rehabilitators of the blind rethink their work and take the responsibility that is duly theirs. Since blindness and sightedness may be understood as socially-organized phenomenon, all of us have a deep responsibility for whatever conceptions of blind persons exist. In other words, we are suggesting that we do not ignore our responsibility and place it on some abstract, theoretical notion of problems and needs, but rather that we confront our work and take full responsibility.

The final, and in a sense, the most crucial consequence of our understanding of integration is that the world of blindness must be accepted and respected. For us, integration is not merely some blind child sitting in a classroom among sighted children. Integration is not merely a blind bowler bowling in a sighted bowling league. Integration is not merely a blind child participating in Boy Scouts or Girl Guides. This is certainly part of our notion of integration, but clearly a minor part. For us, integration is manifested in that person who is internally integrated to the point where he/she can confront life with its beauty and ugliness, its good and evil, with heart, courage and wisdom. This sort of integration requires a great deal more than the acquisition of technical skills. Our version of the "good blind person," or for that matter "good person," is one who reflects on his/her life and takes responsibility for his/her commitments. And, again the acquisition of skills is certainly part of this but only a small part.

The conventional view of integration concentrates so heavily on trying to determine how it is that children can be "fitted into society" and forgets that blind children have a world of their own. And, the notion of "fitting someone into society" is itself bizarre. It is bizarre to suggest that blind persons "should be integrated into society." This is bizarre because where are blind persons now? Are they somewhere other than in society? And, if so, where? Blind children are indeed in society and so is everyone else. We find ourselves in society from the moment we are born. Now, it may be the case that we do not like how blind children are in society but they are in society without question.

In order to respect the world of blind children we must first of all accept it as a world. We must not think that blind children know nothing about the world. From the moment they are born, blind children are continuously relating with the world. And, this relationship produces knowledges and understandings about the world. It is this knowledge and understanding that conventional views of integration disclaim and understand as distorted. But, these claims are based on very little evidence. That is, little is known about the world of

blind persons, whether those persons are totally blind, partially sighted, congenitally or adventitiously blind. Because the world of blind persons is not respected and because it is considered defective discussing that world is not usually a consideration. The attempts made to discover that world are often made with the purpose of finding out how much distortion there is so that proper "integration methods" can be administered.

In recent years, there have been various political and social movements in our society surrounding certain groups of individuals. For example, women, Blacks, and native people are now beginning to stand up and proclaim that being a woman, or a Black, or a native person is worthwhile and good. Moreover, these movements suggest that there is something distinctly woman about womanness, something distinctly black about blackness, and something distinctly native about nativeness. And, in a similar way, there is certainly something distinctly blind about blindness.

An alternative conception of integration, a conception we find more useful and positive, is that blind persons are strangers in a sighted culture. Viewed from this perspective, our job as educators and rehabilitators of the blind is to assist blind persons in becoming familiar with the customs and folkways of the sighted culture. Assisting blind persons in becoming familiar with the sighted culture does not mean that it is necessary to first destroy their culture. We are only now beginning to realize what we have destroyed in our attempts to make native persons white. Furthermore, it is necessary to slow down the education and rehabilitation process for blind children. We should listen carefully to the old adage that "haste makes waste." It typically takes a long time to learn the customs and folkways of a new culture. Teaching blind children the culture of sightedness should be done slowly and thus more sensitively. Moreover, it is crucial that blind persons be allowed to choose. Just as others do, blind persons should be allowed to choose what customs and folkways of the culture in which they wish to participate and which aspects of that culture they wish to ignore. The United Nations has proclaimed 1979 as the "International Year of the Child." Perhaps, "work for the blind," wherever it takes place, should follow the lead of the United Nations and proclaim the 1980's not as the decade of the blind child, but rather as the "decade of the blind child's world," or better as the "decade of the blind person's world." And, in this sense, work and research "for the blind" should concentrate, more than ever, on attempting to find out the customs and folk ways of the blind culture. The 1980's have the potential for being the decade of acceptance and respect for the world of blind persons and hence as the decade that marks an initial attempt to formulate what is distinctly blind about blindness. It is time for all of us who are involved in work with blind persons, in whatever way, to rethink our work and the sorts of conceptions and consequences our work commits us to. It is also time for those of us who are blind to rethink our lives and bring to manifestation those commitments that lie buried by the concrete surface appearances of the way we live our lives. We choose to live our lives in a particular way. But, that we do choose is something that

we typically forget. And, the way we choose to live our lives covers our choice to a commitment of a version of the "good life." Rethinking will enable us to bring to the surface this buried notion of the "good life" so that we may reexamine it and decide once more whether or not it is a life worth living. Perhaps, we may learn a lesson from the ancient Greeks and from the modern existentialists when they suggest that the only good life is the life that remembers that it is a chosen life and that we have commitments to which, and for which, we are responsible.

In conclusion, then, the preceding discussion has attempted to concretize our rethinking of our own lives, our work with blind persons, and our relationship to the world. We do not ask for agreement or disagreement. The questions we raise in this paper are not the sorts of questions that demand quick answers. Questions that demand quick answers are not worth asking and their asking is usually occasioned by an understanding that a quick answer is available. What we hope this paper will generate is more thought. And, in our fast moving technological world, thought is being pushed to one side in order to make room for a kind of nonthinking action. And, our work with blind persons is more and more closely resembling a sort of thoughtless education and rehabilitation factory. Perhaps Heidegger is correct when he writes, "Most thought-provoking is that we are still not thinking--not even yet, although the state of the world is becoming constantly more thought-provoking" (Heidegger, 1968: 4). Nothing can be more thought-provoking and demand more thought than our work with blind persons. We hope that in a small way we have contributed to the provision of the impetus to stop our busy work for a moment and to think about what it is we are doing in the name of, for, to, and with blind persons.



## References

- Garfinkel, Harold. Studies in Ethnomethodology. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1967.
- Graubard, Allen. Free the Children: Radical Reform and the Free School Movement. New York: Vintage Books, 1972.
- Heidegger, Martin. What Is Called Thinking? New York: Harper and Row, Publishers, Inc., 1968.
- Holt, John. How Children Fail. New York: Dell Publishing Co., Inc., 1965.
- Lowenfeld, Berthold, M.D. The Changing Status of the Blind: From Separation to Integration. Springfield, Illinois: Charles C. Thomas, 1975.
- McHough, Peter; Raffel, Stanley; Foss, Daniel C; and Blum, Alan F. On the Beginning of Social Inquiry. London: Routledge & Kegan Paul, 1974.
- Merleau-Ponty, Maurice. Phenomenology of Perception. Great Britain: Routledge & Kegan Paul, 1962.
- Neill, A. S. Summerhill. New York: Hart Publishing Company, 1960.
- Rogers, Carl R. Freedom to Learn. Columbus, Ohio: Charles E. Merrill Publishing Company, 1969.
- Ryave, A. Lincoln, and Schenkein, James N. "Notes on the Art of Walking." Ethnomethodology, ed. by Roy Turner. Great Britain: Penguin Books Ltd., 1974.
- Schutz, Alfred. Collected Papers I, The Problem of Social Reality. The Hague, Netherlands: Martinus Nijhoff, 1973.
- Schutz, Alfred. The Phenomenology of the Social World. Northwestern University Press, 1967.
- Scott, Robert A. The Making of Blind Men. New York: Russell Sage Foundation, 1969.
- \_\_\_\_\_. The Underachieving School. New York: Dell Publishing Co., Inc., 1969.
- \_\_\_\_\_. Collected Papers II, Studies in Social Theory. The Hague, Netherlands: Martinus Nijhoff, 1971.

## THE ROLE OF THE REHABILITATION TEACHER

*This article explores the developing profession of rehabilitation teaching. The character of the rehabilitation teacher is discussed, as well as the social work and education aspects of the rehabilitation teaching approach. Refining sensory development skills, collecting meaningful resources, updating case study research, and writing and publishing are offered as tools for the modern day rehabilitation teacher.*

*Five issues affecting rehabilitation teaching specifically, and rehabilitation of the blind generally, are investigated. The first examines residential rehabilitation training and the client's family, where role reversals, recognizing the existence of the client's family, and evaluation feedback are discussed. The second questions the blending of rehabilitation teaching with other professions. Within this section, the teacher-counselor and dual-competency concepts are reviewed. The third looks at the administration of rehabilitation teaching programs, and the importance of personal growth experiences provided by good supervision. The fourth issue explores the on-the-job training of personnel by university trained rehabilitation teachers. The fifth issue investigates the phenomenon of patriotic one-upmanship and questions its use by those who work in the blind rehabilitation field.*

*Projected population and economic changes in the 1980's are discussed, as well as their possible ramifications for rehabilitation teaching. The discussion primarily centers upon services to middle-age and elderly clients and the future of itinerant teaching services. Various suggestions are made to aid the developing profession of rehabilitation teaching with the task of seizing appropriate opportunities.*

### REHABILITATION TEACHING: DEVELOPING A PROFESSIONAL CHARACTER, CONFRONTING ISSUES, AND PLANNING POSITIVELY FOR THE FUTURE

by

Robert G. Utrup, Rehabilitation Teacher  
Michigan Rehabilitation Center for the Blind  
1541 Oakland Drive, Kalamazoo, Mi. 49008

## Introduction

Writing an article on rehabilitation teaching is by no means an easy task. For decades the field has been struggling for recognition as a viable blind rehabilitation profession. As many readers are well aware, the road to recognition has not been a smooth one. Rehabilitation teaching has made mistakes in the past, as have all growing professions, but none have been so devastating as to have caused permanent damage. Through it all, rehabilitation teachers have gained a reputation for being a hardworking, responsible, and introspective group of people. Today, the field of rehabilitation teaching is still growing and struggling with issues and controversies. But, despite these rumblings the future looks promising. More and more, talented and professionally-minded individuals are viewing rehabilitation teaching as a true opportunity to serve the visually impaired. An attempt has been made in writing this article to reflect upon the character, the strengths, the problems, and the plans of a developing profession.

## Greater Service Awareness

### Developing character of rehabilitation teaching

Rehabilitation teachers believe that the client deserves a patient instructor. They realize that successes, like all "good things," come in small packages. They know that clients learn to perform whole tasks by mastering individual steps. Rehabilitation teachers provide clients with realistic evaluation experiences, and they learn not to be over-complimentary or too critical. These teachers use the client's ability to learn, not their own abilities to teach, as a yardstick for measuring performance. Skilled rehabilitation teachers use a fine balance of encouragement and critical evaluation to aid the client in performing at his/her best. Rehabilitation teachers respect human dignity and the personal integrity of their clients--they never carry a learning experience to the point of humiliating, degrading, or demeaning a client. Rehabilitation teachers are accepting of all clients. They realize that they are not asked to like or dislike clients, but to accept them and their circumstances. Such skilled workers remember that every person is a product of a special set of circumstances, and that the client's way may not always be the teacher's way. They know that small things can make the attitudinal difference for a client. It may be a specific skill, the act of involvement, or the right word at the right time. Rehabilitation teachers believe in the "over the hump" phenomenon, and they subscribe to the theory that the visually-impaired client must eventually reach from within in order to make rehabilitation truly a successful experience. Rehabilitation teachers



recognize the importance of other disciplines, and they--at all times--try to be supportive of these disciplines so as not to encourage an unofficial ranking of the professions. Teachers recognize the bounds of the occupation, and in so doing, they understand their own limitations and the scope of their expertise.

#### Adaptations and alternatives: two RT watchwords

Teaching adaptive and alternative techniques to blind and visually-impaired clients is a two-step process for rehabilitation teachers. The first step is a direct and concrete teaching strategy, whereby clients undergo training in specific skill areas, e.g. adaptive kitchen skills, personal management and communications. The second step is a more subtle kind of instruction whereby clients learn to think in terms of adaptations and alternatives. Clients, with the proper guidance and encouragement, begin to use ordinary supplies and products as they tap their own resourcefulness. The specialty teaches the client to make adaptations within the environment where feasible, and it encourages the client to develop a maximal degree of personal adaptability that will be a life-long aid in dealing with the visual impairment.

#### Education and rehabilitation teaching

Rehabilitation teachers are not typical educators, but they have through their training an understanding of basic education principles. They are especially skillful in their dealings with the adult learner. They are well acquainted with principles of adult education such as the need for honest encouragement and assurance, the importance of concrete examples, the need for repetition and ample learning experiences, and the need for various teaching tactics to handle the "artful dodger." While rehabilitation teachers are knowledgeable of education principles, they must be alert to the danger of overemphasis at the expense of rehabilitation goals. Rehabilitation teachers are careful to integrate the appropriate amount of education to expedite rehabilitation. Teachers avoid taking on the identity of "Mr. Chips" by refraining from using the concepts associated with academe such as grades, term papers and final examinations. Instead, these practitioners think in terms of mature clients, environmental challenges, useful achievement, and self-assurance to do a job confidently and skillfully. Rehabilitation teachers instruct clients in specialized communication techniques; they do not teach literacy. Rehabilitation teachers teach adaptive methods for recording numbers and computing arithmetic problems common to everyday life; they are not mathematics teachers trying desperately to fill large voids in a client's academic history. Teachers instruct clients in organizing and labeling foodstuffs, in adaptive cooking techniques, and in available resources for the blind homemaker; they are not home economists or dietitians. Therefore, they do not claim expertise in consumer buying, nutrition, and diabetic diets. Rehabilitation-teaching practitioners are well-rounded individuals who

employ an understanding of basic educational techniques to deliver meaningful rehabilitation instruction. Such understandings prevent a confusion of roles and keep the rehabilitation teacher from becoming a frustrated worker trying to be all things to all people.

### Social work and rehabilitation teaching

Rehabilitation teachers have a command of interviewing techniques that glean important information while protecting the client's need to privacy. They have been trained hopefully to be artful listeners and patient observers, and at all times to be conscious of the emotional climate of the interview so as not to make the client recount painful personal histories when the same information is available in the client's record. These records are reviewed thoroughly so as to provide a larger picture of the client's world. These practitioners should be fully aware of community resources and capable of making the proper referrals so that the total person can be adequately served. Their understanding of the philosophies of various agencies aids them in interpreting social service programs correctly, which in turn, heightens the success of the referral process. Teachers realize that most federal monies spent on rehabilitating the handicapped are available so that clients will find successful employment. Consequently, they must understand in specific terms how other professions are accountable to the rehabilitation process. This understanding enables them to respond quickly and positively to the teamwork approach.

### Teaching tools for the modern day teacher

#### Sensory development skills

Rehabilitation teachers have been taught that when a client loses his vision he must rely on his other senses to function in day-to-day life. Only recently, however, has the field of rehabilitation teaching ventured beyond this basic premise and taken a more analytic look at sensory development in the teaching of daily living skills. Teachers are now, through their training, more precise in their instruction of sensory-development skills. Today, the rehabilitation teacher is capable of providing concrete and practical examples of how sensory awareness provides valuable feedback for the client. Clients now learn to recognize such things as the "peak odors" from a batch of baking cookies or the colorful configuration of a particular label. During the 1980's rehabilitation teachers will continue to advance their knowledge of sensory development instruction, and it will be considered a practical and easily understandable teaching strategy.

#### Dynamic resource person

It is common for rehabilitation teachers to pour over flyers, newsletters, brochures, pamphlets, magazines, catalogs, directories,

and bibliographies hunting for valuable resources. During the process it is not difficult for the teacher to dream of a day when some "organization" will act as a clearinghouse for all resources. In such a dream, the clearinghouse does all of the investigating, evaluating, sorting, and organizing so all the practitioner has to do is drop the resource card in a file box. This, however, is as far as the dream usually goes because it becomes apparent that the arduous task of collecting meaningful resources is an individual professional responsibility. The people who maintain resource files learn to sharpen their investigative instincts--they learn to patiently dig for useable information. This indepth search acquaints the teacher with scores of professional publications and it encourages the reading of professional literature. It also requires that the rehabilitation teacher develop a discriminating judgment in order to isolate those resources relevant to the rehabilitation-teaching experience. With enough practice the teacher begins to understand how large the field of rehabilitation is, and in so doing, understands the boundaries of rehabilitation teaching.

With the increasing number of services, organizations, and adapted products, the rehabilitation teacher must be more resource-minded than ever before. The dedicated rehabilitation teacher of the 80's--like his 70's counterpart--will spend many hours each year adding and updating important material to make the personal resource file a dynamic service tool. This efficient and highly informed approach will aid the teacher in maximizing the eight hour work day by bringing more referral service to more clients.

#### "Switching on" case study research

For many years case study research has been a valuable tool in rehabilitation teaching as well as for the rehabilitation field in general. Too often, however, case study research is not disseminated like other forms because of the bulk of information that surrounds each individual subject. Rehabilitation teachers, together with those in other service occupations in the rehabilitation field, should discuss the feasibility of establishing a center for case study research. In such a center, computer technology could speedily classify the nature and outcome of each case for immediate retrieval and dissemination. Thus, rehabilitation teachers and other rehabilitation workers could submit studies along with pertinent descriptors for classification, i.e. eye condition and degree of vision, low vision aids effectively used, special programs implemented that have succeeded and failed, and success or failure of vocational training and placement programs. With this kind of service, rehabilitation workers could possibly be more efficient in their use of time by not having to travel well-trodden ground. Also, the case studies could creatively guide those workers who are less inclined to be innovative in their approach to special problems.



## Writing and publishing

Frequently, articles written about the future of a developing profession will suggest that members of that occupation sit down, pick up the pen, and write about important issues of the day. This type of recommendation is indeed salutary. However, many workers who have the energy and discipline to write often lack the proper encouragement and guidance. To protect the precious enthusiasm of the prospective writer and to promote this valuable teaching tool, the field of rehabilitation teaching should not only encourage writing but direct the efforts of those who wish to write. The following are some possible ways of channeling that enthusiasm.

1. Bibliographies supposedly pertaining to rehabilitation teaching have been, in the past, random collections of material misrepresenting the purpose and scope of the field. Therefore, there is a tremendous need to compile a comprehensive rehabilitation teaching bibliography of articles, manuals, unpublished papers, and brochures.
2. Itinerant rehabilitation teachers need to document in detailed fashion how the client's family participates in the rehabilitation teaching process. Such information would have relevance to the rehabilitation teacher in the center setting who wishes to be supportive of family ties.
3. Rehabilitation teachers need to discuss the nature of, and the concepts surrounding the term "independence." Too often it is assumed that everyone's concept of independence is identical when, in fact, definitions may be quite varied. Questions must be answered that deal with subjects such as voluntary dependence, systematic interdependence, and the changing nature of independence as personal wealth grows. The dialogue produced by such articles will aid the practitioner in selecting and responding to real rather than presumed client needs.
4. Teachers should routinely submit research ideas to the university programs so that rehabilitation teaching staffs can evaluate their feasibility as topics for student research assignments.
5. Itinerant and center teachers should correspond frequently with one another to provide professional support and encouragement. When a teacher is successful at publishing material, other teachers should write and offer their comments and congratulations. This type of response would provide the author with the necessary feedback to update and/or expand the material for yet another publication. Rehabilitation teachers should be quick to express their opinions on crucial matters by writing the

editors of professional publications. Also, teachers should respond promptly to correspondence from other teachers so that a lively and free-flowing dialogue develops.

6. There is a need for additional material in the areas of adaptive kitchen skills, concept development, sensory development, base level independent living skills, the tape medium and the visually impaired, adaptive home mechanics skills, the teaching of skills through sub-channel radio broadcasts, low vision utilization for daily living skills, resource development and distribution, teaching appropriate skills to the adventitiously blind, teaching strategies for the adult congenitally blind student, intern supervision techniques, supervision of rehabilitation teaching services, and coordination and teamwork potential between rehabilitation teaching and orientation and mobility. These and other materials would improve services to clients and provide further evidence that rehabilitation teaching has as its foundation a specific and useful body of knowledge.

Issue: Residential Rehabilitation  
Training and the Client's Family

One of the most overlooked issues concerning residential rehabilitation facilities is the effect of the training approach upon the client's family. There are, in this author's opinion, certain aspects of residential training that adversely affect the strength and cohesiveness of the family unit. It is recognized that residential training is generally a trying experience for the family, and that no rehabilitation program wishes to weaken the love and support relationships between a client and spouse or a client and his children. And yet, services are sometimes presented in such a way as to put the family outside the mainstream of activity. Rehabilitation teachers can effectively encourage strong, healthy family ties by having a working knowledge of where these breakdowns occur.

Role reversals

Client to teacher: "I went home last weekend and tried to help my wife around the house. Everytime I tried to show her something I had learned at the center she accused me of trying to take over and run everything. Sunday, I got up early and made breakfast for both of us to surprise her. When she saw what I had done she screamed, 'That's it! It's very obvious you do not need me anymore so I'm

leaving you!' Can you believe it!? After forty years of marriage she's going to leave me. Well, if she thinks I'm just going to roll up and die she's crazy! I deserve a little happiness too."

Unfortunately, rehabilitation is sometimes viewed by a spouse as a challenge to their effectiveness as a dutiful husband or wife. Spouses will occasionally believe that rehabilitation training is an attempt to make the visually-impaired husband or wife independent of them. Not all of these fears are groundless, unfortunately, for a young and zealous rehabilitation worker can define rehabilitation skills so strictly, and establish client needs in such an absolute way to ignore established family roles. If the spouse rallies to protect the present structure of the family he/she becomes, to some rehabilitation workers, an obstacle in the pathway of rehabilitation training.

The client in the above narrative was disappointed at his wife's reaction to his cooking breakfast. He spent many hours in the training kitchen preparing many kinds of foods, gaining a sense of achievement and belonging in this new environment, and being convinced that he should expect to do such things at home. Before this could take place, however, it would require a major role shift for a woman who for many years had been responsible for meal preparation.

In contrast, an older gentleman once told the author that he had been married thirty-eight years, and every morning for thirty-eight years he had made coffee for him and his wife. According to his wife he had yet to make a good cup of coffee. "Everyday she would doctor my coffee," he said, "because it was always too weak, too strong, too bitter, too sweet." He continued by saying that learning to cook would be inviting trouble and bad feelings into his household. "That's the way things are," he concluded, "so why try to change them after all of these years."

These two anecdotes are not offered as evidence that male clients should not receive adaptive cooking instruction, but rather that rehabilitation teachers--as well as other rehabilitation training personnel--must be careful not to encourage a client to abandon accepted and meaningful family roles for the sole purpose of learning a particular skill.

#### Recognizing the existence of the client's family

Teacher: "I heard you went home last weekend."

Client: "Yeah, we had some big family doings. . ."

Teacher: "Oh, sounds like you were busy . . . Today, we are going to continue with the lesson we started on Friday."



This brief, informal give and take is an example of how a well-meaning and normally sensitive worker can unknowingly pass over an RSVP invitation by a client to talk about his family. The client, in most cases, does not plan to relay a blow by blow account of the weekend but wishes instead to share a few significant events in a developing family history. Such family histories are written in simple ways by such things as the score of a son's football game, the weight and length of a fresh water salmon, or the excitement of a daughter's birthday party. Therefore, it is important for a rehabilitation teacher to reach out for some family event and share it briefly with the client. The teacher may find it difficult to remember specific details of a client's family life. Nevertheless, a hazily remembered detail or event is well received by a client who is mentally and emotionally attached to a family some distance away. If, for example, a teacher is told on Friday that Junior's big game is on Saturday, the teacher should try to remember to ask for the score on Monday.

The subtleties of this particular problem area are ever-present. The client can go for weeks without hearing anyone mention his family members in conversation. Teachers will talk at great lengths about the skills they want the client to learn; counselors will spend hours discussing feasible vocational goals; and fellow clients converse continuously about the affairs of the center's "big family." Throughout it all, the family-oriented client learns that others do not expect to hear personal accounts of everyday family life. The client becomes acutely aware of the lack of interest in family activities back home. No one seems interested in how the children are doing in school, how the spouse is managing without them, or how the entire family feels about the separation. It appears that the ground rules for conversation are clearly written, and they do not include details of family life.

Far too often, rehabilitation workers will unknowingly replace real life significant others with themselves, or with a skill that is stressed to the point of personification. The client may consciously or subconsciously resist this encroachment into his personal life, but eventually he realizes that he must be tolerant if he is to succeed within the residential rehabilitation facility. To resist overtly is, in essence, an admission that the client lacks the courage and proper attitude necessary to deal with the disability. Such an admission would obviously be far too devastating to personal self images that are already under tremendous strain.

It appears that men are more inclined to endure in silence than to voice their concerns; whereas, it is not that uncommon for women to say, "I will give you three weeks to teach me as much as you can and then I'm going home." The self-directed approach that women appear to use may be due to the fact that a woman's image ties her more closely to family life, i.e. devoted wife and loving mother. A man's image, on the other hand, is often tied to pursuits that demand the courage and sacrifice of leaving one's family for an extended period, e.g. military service. Consequently, men seem more disposed

to a system that ignores the existence of loved ones. Susceptibility to such a system is enhanced when a vocational training program, requiring further separation from the family, is recommended as the culminating effort of the rehabilitation plan.

### Precise feedback

Client: "My family wants to know when I will be finished with the program."

Teacher: "Well, you're making very good progress so it shouldn't be too much longer."

In open-ended rehabilitation programs, clients should be continuously supplied with precise feedback as to when they will be finishing a particular course of study. Inconsequential remarks, such as the ones above, should be dropped in favor of frank discussions of what the client has successfully completed, what he has left to complete, and how long it should take him. Such feedback reduces feelings of uncertainty and anxiety experienced by the entire family. It also prevents some clients from seeking extended refuge within the residential rehabilitation facility. Rehabilitation teachers and other rehabilitation instructors must develop the discipline to accurately estimate the time of course completion. In this way the client remains goal oriented and can more easily note, record, and communicate progress information to the family. These mile markers will aid the family, as one unit, in developing plans for the future.

Issue: Blending Rehabilitation  
Teaching With Other Professions

### Teacher-counselor: boon or bust for a developing profession?

In this author's opinion, one of the more unfortunate happenings in rehabilitation teaching in recent years is the advent of the teacher-counselor concept. By definition this worker is an itinerant rehabilitation teacher with some counseling responsibilities. Thus, one blindness professional is assigned to any given area instead of two. From strictly an economic standpoint the concept is attractive because of obvious savings. From a rehabilitation-teaching service standpoint, on the other hand, the teacher-counselor concept is distressing--counseling duties quickly consume almost all the time spent in face-to-face client contact.

In the past, the itinerant rehabilitation teacher had to be quite creative to meet the rehabilitation demands of his clients. He/she had to compete with enormous service areas and the concomitant time spent traveling from one client to another. With the addition of counseling duties the competition for time becomes overwhelming

because the teacher-counselor becomes immersed in IWRP's and the accompanying paperwork. The end result is that few hours are spent each month delivering rehabilitation teaching services. The undoing of the teacher-counselor concept where it exists, would require a forceful challenge by those individual teachers involved. Eventually, it is hoped, rehabilitation teachers will establish a code of professional conduct that will discourage this kind of occupational blending.

The effective growth of rehabilitation teaching is hampered in some states because the reward and promotion system requires that the practitioner abandon teaching and take up counseling. Where this system exists, it keeps rehabilitation teaching in an infancy stage by prohibiting the development of highly experienced practitioners, and by preventing the establishment of strong rehabilitation-teaching supervision. It is obvious that rehabilitation teachers in these states have to lobby for a reward system that prizes teaching expertise. In these locales, the individual teacher, with the verbal and written support of the Association of Rehabilitation Teachers, should provide input to the state civil service offices, so that written job descriptions can be more explicit in terms of the talents and level of expertise required to be a teacher or a teaching supervisor. These written descriptions would focus attention upon the value and scope of this kind of work for the blind, and thus find a more favorable audience among county, district, and regional supervisors. In short, it would help change the system of rewards by providing avenues of advancement from within rehabilitation teaching.

### Orientation and mobility

Within the teamwork atmosphere a great deal of discussion takes place concerning the roles of rehabilitation teachers and orientation and mobility instructors. The discussions, and sometimes the ensuing debates, become dogeared at times. But for the most part, they aid in defining the two occupations, as well as providing a vehicle for healthy competition. In the field of blindness, there are probably no two professions that work so closely and so skillfully together. Where these two professions exist in the same geographical location, there is ample evidence that their work as a team is definitely superior to individual effort. This is because of similar training experiences and common interests in delivering realistic and meaningful living-skills instruction. Both occupations have had specialized blindness training. The training teaches the worker who the blind person is; what psycho-social stresses are involved in the adjustment process; what implications and etiology of blindness has on prognosis and the rehabilitation approach; how the client benefits from confidentiality, empathetic assessment and direct action; and how modifications, adaptations, and alternatives can be employed to provide the visually-impaired client with the confidence and skill needed to resume a way of life that the client has selected for himself.



A recent development in academic training has been the introduction of the dual-competency professional, who completes the requirements of both the rehabilitation teaching and orientation and mobility programs. On completion of such a program, this person is qualified to teach in both fields. The advent of this program has brought with it a few concerns. Some practitioners, for example, fear that dual-competency will do away with visually-impaired teachers because (1) orientation and mobility training has a vision requirement, and (2) dual-competency graduates will be in great demand by employers because they can have two blindness workers for the price of one. In other words, it is feared that employers will give preference to the dual-competency worker which will, intentionally or unintentionally, eliminate rehabilitation teaching as a vocation for the professionally minded visually-impaired person.

It is the opinion of this author that these fears are groundless. The field of rehabilitation teaching encompasses such a wide range of rehabilitation skills so as to insure that there will be an ample market for persons with expertise in rehabilitation teaching alone. Furthermore, a closer look at the rehabilitation field will show that the demands upon a rehabilitation teacher will in most circumstances preclude the teaching of cane travel. In other words, there are only so many hours in the work week for the rehabilitation teacher skills, leisure time activities, indoor orientation and movement techniques.

For those who are slow to put their fears at rest, there is yet another factor that will be coming to the forefront. This is the question of whether or not a visually-impaired person could adequately perform the duties of an orientation and mobility instructor. The future may bring with it the acceptance of such a person by university programs. It will be interesting to see what course dual-competency takes in the 1980's. But at no time should it be feared that such a program will do away with the visually-impaired rehabilitation teacher.

Since the beginning of rehabilitation teaching service, visually-impaired teachers have been one of the strengths of the field. They have added tremendously to the developing profession because of their insights into the problems blind people face. They have helped keep the field of rehabilitation teaching in touch with the vast movement of the blind in all aspects of society. From all indications, it appears that the visually-impaired rehabilitation teacher will remain a vital part of the growing profession, and will continue to help the field in its efforts to bring meaningful, creative, and efficient service to clients in rehabilitation centers and itinerant settings alike.

## Issue: Administration of Rehabilitation Teaching Programs

Probably the most underrated issue in the field today is that of adequate administration or supervision of rehabilitation-teaching programs. No issue affects service to clients and growth of a profession as much as inadequate supervision. Nothing is as crippling to a developing profession than administrators who are ineffectual at providing growing experiences. Inadequate administration and supervision destroys teacher incentive, program delivery, and the ongoing system of research needed to make services more useful and appropriate.

### The hope factor

It is ironic, to say the least, that rehabilitation workers who are trained to handle the delicate personal problems of the client are often themselves subjected to insensitive handling by supervisors. In rehabilitation teaching, as with other helping occupations, there is a tremendous need for life sustaining support rather than life draining treatment. There is a "hope factor" provided by good administration that is vital to self-awareness, personal achievement, and professional growth. This hope factor is far too often ignored by supervisors. The outcome is devastating for the rehabilitation worker who spends a great deal of emotional energy in dealing with clients. If the rehabilitation worker spends a great deal of energy on the client, he must then be recharged with the proper rewards available through good administration. If the worker receives no encouragement from his supervisor, he must then fight individually against emotional fatigue and program pessimism. If the administration not only lacks the ability to provide encouragement but is pessimistic and distrustful, the rehabilitation worker finds that maintaining creativity and perseverance is a fulltime job in itself.

### Personal growth experiences

Teachers must lobby for supervision that is more knowledgeable in the area of rehabilitation teaching and more accepting of the need for personal growth experiences. Administrators and supervisors of rehabilitation-teaching programs must be encouraged by professional organizations to provide money for conference attendance and continuing education experiences. If money is simply not available for conference attendance and continuing education, then administrators can spur personal growth through other activities, e.g. research, in-service training, public relations activities, writing and publishing, and professional committee assignments.

Rehabilitation teachers should actively seek out administrators and supervisors who warrant recognition for their fine efforts on the

part of rehabilitation teaching. In this way, teachers can offer hope and encouragement to the administrator who is working hard at providing growing experiences for rehabilitation teachers. This kind of support and recognition will serve to emphasize the need for a strong and supportive relationship between rehabilitation teaching and administration. Furthermore, it would underscore the need for personal growth experiences and would be a constructive means of stressing the need for properly trained administration.

### Over-specialization or under-utilization?

Teachers often express the fear that residential rehabilitation facilities can be confining or restrictive because of the over-specialization by some teachers. In short, they fear that once a communications instructor, always a communications instructor, with no opportunity to teach or serve in other ways. Some practitioners fear that the issue is not one of over-specialization by teachers but under-utilization by administrators. The issue is complicated by the claim of some visually-impaired teachers that they are under-utilized by administrators who do not understand the full capabilities of a visually-impaired rehabilitation teacher. As if this issue is not complex enough, it is further complicated by the excellent memories of some administrators who have had negative experiences with a visually-impaired teacher who was illprepared to carry out the teaching assignment.

Sorting out and understanding the issues involved here is important because it does point directly to a few solutions. Because an ill-prepared teacher makes such a lasting impression, the rehabilitation teaching training programs and internship experiences must continue to make qualitative improvements. Administrators, on the other hand, must be willing to help teachers grow and develop according to their special talents, and they must learn to drop those "pet" stories involving an individual teacher when the story has no value as a learning tool. Many of these highly descriptive accounts are passed from one administrative generation to another for the sole purpose of pleasing the storyteller. Consequently, the creativity and imagination of young administrators and teachers alike are often diverted by old prejudices and biases.

### Moving up

Every emerging profession aspires to have some of its members become administrators so that programs are more responsive and understanding to that particular field of expertise. Rehabilitation teaching is no different from any other professionally-minded field in this regard. It is hoped, therefore, that able leaders within the ranks be identified and promoted to administrative jobs that require more in the way of responsibility and accountability. It is, however, presumptuous of any profession to promote administrative leadership as the eventual objective for all of its members. Blindness



professionals should recognize that administration is, in itself, a specialty that requires coursework and apprenticeships. Rehabilitation teaching is quick to recognize that administrative leanings are not synonymous with administrative expertise. No one occupational group attracts those people who will be "natural" administrators. The entire field of rehabilitation of the field will be healthier in the 1980's if administration is looked upon as a career that requires a specific set of skills, rather than as reward for serving admirably in some nonadministrative position.

#### Issue: The Training of Para-Professionals

Some teachers, lacking an historical perspective of rehabilitation teaching, are enthusiastically training "the man off the street" to be a rehabilitation teacher as if the concept were new, exciting, and untried. These people, who are themselves graduates of university programs, turn around with startling quickness to conduct quasi-professional training sessions as if to say university training is of little importance. This well meaning, yet untutored approach, stymies the growth of an efficient and valuable service delivery profession. From this kind of training experience, an ever continuing mass of people are entering the field of rehabilitation teaching inadequately prepared; lacking not only abilities in techniques instruction, but in a basic knowledge of the disability and the adjustment process itself. For the most part, these trainees are unaware of the vast number of resources available to aid blind individuals, and are uninitiated in key issues of rehabilitation teaching and in the blindness field in general.

The issue is complicated further by supervision that demands that a university-trained rehabilitation teacher train others on-the-job. At such times the teacher should be able to decline such an offer, pointing quickly to a code of ethics or set of standards outlined by a professional organization discouraging such activity. Unfortunately, university-trained rehabilitation teachers have been too slow in writing detailed philosophies, so they are, at this time, unable to address the problem in a meaningful way. It is hoped that within the next year or two the Association of Rehabilitation Teachers will have a solid philosophical base and widespread support to reject effectively the on-the-job training of rehabilitation teachers. This would do much to promote long term, steady growth, and quality based programming.

Of course, not all offers to train paraprofessionals come wrapped in plain brown paper. An offer may include a new title, a private office, more money, a travel budget, and a seat around the director's table. All of this is, admittedly, a tremendous temptation and requires deeper reflection and personal sacrifice.

## Issue: Patriotic One-Upmanship

This issue does not specifically relate to rehabilitation teaching or any other specific service to the blind and visually impaired. Rather it is a curious phenomenon that has widespread implications for everyone. Patriotic one-upmanship is the process of short-circuiting meaningful discussion by charging the initiator of the discussion with professional insensitivity. In other words, if someone wants to reflect on the implications of a program, policy, or action, he is confronted by an ominous and vague charge that he does not have the best interests of the blind at heart. The accused then must quickly drop his concern over a particular issue, and defend his personal integrity and his character as a concerned helper.

In the past seven years this author has seen hundreds of examples of patriotic one-upmanship. In each case, some brave soul stands and challenges the crowd to think, and invariably the crowd responds in the same time-worn manner. Someone in the crowd, rather than spending the energy and time to ponder a problem or suggestion, usually skirts the entire issue with humanitarian flag waving and personal accusations. The one who "waves the flag" and accuses is often the one who is improperly motivated. On the other hand, the one who is shouted down, laughed down, or who bows out to the sound of applause for the apparent protagonist, is the one who is seriously and thoughtfully concerned about service to blind people.

Many issues of great consequence are continually avoided because of the prosecution/defense scenario of patriotic one-upmanship. This author believes that it is easy and expedient to wrap opponents in a flag of patriotic sentiment, rather than spend the energy to explore thoroughly a meaningful issue. Within the next decade, people involved in work for the blind should try and develop a concern for the brave individual who dares to challenge others in the field to think.

## Projections and Recommendations

### Population changes

As a result of the baby boom of the forties and fifties, a large number of the blind in the 1980's will be middle-age men and women who will be anxious to resume careers and seek out new job opportunities. One effect is that greater emphasis will be placed on every phase of rehabilitation by the federal government to increase the likelihood of successful vocational placements. The Federal government will have no choice but to supply more money for

rehabilitation skills instruction, in hopes that it will help ease the long term strain on the Social Security System. Rehabilitation teachers must not, however, be lulled by Federal monies. Large Federal expenditures for rehabilitation service will require that the field of rehabilitation teaching initiate a system of intra-professional accountability, by which activity can be more easily monitored and the effects of teaching more easily measured and reported. It will also require that the field produce workers who are skillful in the use of Federal jargon, so they can effectively work with grant applications and program administration.

There will be a tremendous demand for qualified teachers in the South, Southwest, and West, as more and more retirees move to the Sun Belt. This demand will, in turn, improve salaries in these areas. Rehabilitation-teacher consultants will find new job opportunities within retirement villages, nursing homes, and planned community developments designed to meet the needs of the nation's elderly. These consultants will probably be hired by large generic agencies that will try to meet the transportation, housing, and financial needs of the aged population. There will be, therefore, a need to make rehabilitation-teaching services known to these generic agencies, because they will not necessarily be familiar with blindness or the service delivery techniques of rehabilitation teaching. Rehabilitation teaching service to the elderly blind will consist primarily of adaptive cooking skills, demonstration of specialized aids and appliances, adaptive games and recreational activities, techniques for using residual vision more effectively, indoor orientation and movement techniques, resource information, and techniques for using a guide.

### Economics

Much like every other aspect of American society, the field of rehabilitation teaching is going to have to make every dollar count. Practitioners in the field will have to be more disciplined in their approach to client needs and more goal oriented because greater demands will be placed on a more limited time schedule. Creativity, innovation, and a growing understanding of technological advancements will be requirements of each and every teacher rather than luxurious sideline interests. Throughout it all, teachers must maintain a personal awareness and understanding of the individual client, which has been the profession's hallmark.

The complexion of itinerant-teaching service cannot help but be affected by the higher costs of personal transportation. The growing influence of the OPEC nations abroad, and the escalating production costs of personal automobiles here at home, will definitely affect this important aspect of rehabilitation teaching. Coupled together, these two stark economic realities will make home teaching in sparse rural areas an expensive venture and, thereby, create a stringent set of accountability standards for the field teacher. It will increase the demand for residential facilities training, and in turn, it will put pressure upon residential facilities personnel to



be more efficient and disciplined in their approach to client needs. Itinerant teaching will continue to prosper in large metropolitan areas where the teacher can use mass transportation systems. There will undoubtedly be more discussion concerning the dual-competency teaching professional who can deliver both rehabilitation-teaching and orientation and mobility instruction. The real danger, as mentioned earlier, is the match-making between rehabilitation counseling and rehabilitation teaching, in which the teaching is surely going to lose out. It is important for rehabilitation teachers to keep abreast with the planning of itinerant teaching services, for these plans might well plot the course of home teaching services for many decades to come.

### Seizing appropriate opportunity

Rehabilitation teachers must learn collectively to seize appropriate opportunities that will stimulate professional growth and development. All too often, opportunities are lost because teachers lack the wisdom to recognize the value of an activity, event, or responsibility. To grow in wisdom will require that teachers continue to grow in knowledge of the entire profession of rehabilitation of the blind. They must look at the acute pressures felt by their inter-professional colleagues. Teachers must persist in their attempts to learn more about the history, structure, and potentials of the rehabilitation system. They must take the time to listen to experts and read professional journals, pause and assimilate the messages received, and incorporate the messages into a working knowledge of the field.

There is a cost factor, however, for seizing opportunities. The cost, at times, will be in real dollars and cents straight from the family budget. It will mean taking personal funds to attend conferences, or to buy resource materials, or to buy a stamp to mail a personal letter of support or congratulations. It will also mean a personal time investment--time spent listening, speaking, reading, and writing. On a personal feelings level, it will mean--at times--working hard for another colleague without a thank-you. Whether the costs are in currency, time, and/or energy spent, they are--without reservation--costs assumed by an investment minded practitioner.

### Common professional courtesies

In the life of a professional, untold opportunities are presented and lost because the professional is simply not initiated to common courtesies. Some people lack the common business courtesy to return a telephone call or answer a letter. Often a prompt response is required but through procrastination or indifference the professional never replies. There are some professionals, throughout all phases of blindness rehabilitation, who make it nearly impossible to reach them by telephone or by mail. To this person the entire responsibility of communications falls on the one who initiates

the contact. It may take two or three long distance telephone calls or a half-dozen letters in order to stimulate one response.

Rehabilitation teaching and the blindness profession in general cannot ignore those who are carelessly handling communications responsibilities. The standard for rehabilitation work should be prompt and courteous response to all forms of professional communications. The rehabilitation teacher should try to develop personal standards where all correspondence is answered within a week of receiving it. If circumstances are such that much thought and reflection are needed to satisfactorily respond, a short and courteous letter of intent should be sent in the interim.

#### Working with seasoned veterans

In many respects, this is a "Golden Age" of rehabilitation work for the blind. Rehabilitation personnel are surrounded by seasoned professionals who have seen this relatively young field through some difficult and highly political decades. These people are veterans of many meetings, conferences, policy sessions, heated debates, and untold hours of planning and delivering rehabilitation services. Many of those who have written the historical accounts of the past are still with us today. Rehabilitation teachers should eagerly seek out these people and share their grasp of historical events and their understanding of modern-day issues. The decade ahead may prove to be the last active years for many of these pioneers, so teachers must not take them for granted. Whenever and wherever possible, rehabilitation teachers should seize the opportunity to work with these masterful people.

#### Waiting for the right assignment

Often, professionals are eager to participate in the larger picture but they are choosy as to the "how" and "when." These people may receive a personalized invitation to participate, but choose to ignore it because it is neither the right time nor the right assignment. Thus, assignments that would be good initiators are rejected, and the worker remains behind the starting line. Within the ranks of The American Association of Workers for the Blind and The Association of Rehabilitation Teachers, there are countless opportunities to participate, learn, and serve.

#### Strengthening the field through positive input

The most valuable opportunities are presented to rehabilitation teachers within the routine of the average workday. On the job, teachers have the opportunity to represent the field in a professional way through their service to clients, their work with fellow professionals, their instruction to rehabilitation teaching interns, and their contacts with the community. Positive input into all facets

of day-to-day work will do much to improve teaching service and strengthen the entire profession of work for the blind. It also teaches the practitioner to evaluate the work of others in a disciplined and analytical manner. In this way, innocuous praise gives way to introspective encouragement. The end result is that rehabilitation teachers can take advantage of opportunities presented, and they can foster the climate in which opportunity is created.

### Premature growth

Premature movement by teachers in the past has hindered the development of a rehabilitation-teaching philosophy and a meaningful set of standards. This movement has caused some teachers to expand the territorial expertise of rehabilitation teaching without understanding the existing body of knowledge. An inadequate knowledge of the field, and a lack of basic teaching experience, leads to a misrepresentation of who the rehabilitation teacher is, and what is it that he does. New teachers, therefore, should work for a time in the field of rehabilitation teaching, say two years, before they move into specialty areas such as low vision and deaf blindness. This orientation period is, in itself, an opportunity because it familiarizes the teacher with the role, purpose, and scope of rehabilitation teaching.

### A developing profession

#### University training programs

The 1980's will prove to be excellent growing years for the university programs involved in the preparation of professional rehabilitation teachers. The programs that now exist will grow in a qualitative rather than in a quantitative manner. Rather than expanding to handle more students, these programs will expand to provide a more comprehensive learning experience. The caliber of students entering these programs will continue to improve as well. For the most part, these students will be older, having had some previous exposure to the blindness field or the work world of other helping professions. Students that graduate from these programs will have a much greater knowledge of the teaching of adaptive and alternative daily living techniques; they will have an increased understanding of service delivery methods; and they will bring with them many more subordinate skills that will aid them in doing the total job, e.g. sensory development and low vision utilization. The rehabilitation-teacher graduate will have a broader knowledge base that will include a greater understanding of the teamwork approach, improved methods of recording and disseminating research, and creative strategies that will heighten and direct client motivation. As these more highly-qualified graduates move into supervisory positions throughout the decade, the internship experiences for up-and-coming university students will improve dramatically. For previous graduates, the university programs will offer more in the way of postgraduate



seminars, workshops, and continuing-education experiences. University program personnel will continue to provide the appropriate leadership pressing for higher standards in rehabilitation teaching, as well as higher standards among administrators and supervisors of rehabilitation teaching programs.

Regional jealousies, that are a part of American life, make it essential that strong rehabilitation-teaching programs develop in the South and West. The continual growth of the program at the University of Arkansas at Little Rock, and the establishment of a rehabilitation-teaching program in the West, will prove to be a tremendous boon to the field. A graduate program in the West, possibly in a highly-populated state such as California, will do much to expand the visibility of the expertise and create a westward demand for rehabilitation teaching services.

### Research

One of the major responsibilities of university programs is to produce useful research, and yet, ironically, it is often the isolated practitioner who holds the key to a Fort Knox of ideas and data. Consequently, the research produced by the academician often appears weighty and irrelevant to the practitioner. On the other hand, where there is effective communications between university personnel and the field, research tends to be readable and applicable to the everyday work situation. Weak university/field communication lines, therefore, should be strengthened through periodic questionnaires requesting research topics, through roundtable discussions of research ideas, and any other activity that brings the two groups together.

### Developing future teaching strategies

As the field of rehabilitation teaching adapts to changes in needs brought about by technology and the economic climate, the teacher must be careful not to develop teaching techniques that "put upon" the blind person. Training techniques must not appear to isolate the client or call unnecessary attention to him. Nor, should techniques be developed that require unrealistic amounts of energy, time, ego investment, and money. Teaching strategies of the future must be designed to fit easily and comfortably into the life style of the modern day American.

### The Association of Rehabilitation Teaching

The professional organization of rehabilitation teaching, The Association of Rehabilitation Teachers, will continue to grow from basically a Western Michigan University group of graduates into a more comprehensive group of professionals, representing teachers from various geographical regions and academic programs. This organization

will begin to tackle the issue of certification by taking on the responsibility of certifying university-trained rehabilitation teachers. By undertaking certification responsibilities, the Association will enjoy greater recognition and growth. The Association of Rehabilitation Teachers will remain steadfast in its support of other professional blindness groups, and will be active in cosponsoring workshops, conferences, and research programs. Significant alliances will be made while at the same time the organization will continue to develop a feeling of oneness and self-identity. This professional group will promote continuous communications among teachers, so they are at all times in touch with the current state of the art. This active communications effort will undoubtedly lead to a second state of the art conference in the mid-eighties.

### Rich in Heritage

Few other rehabilitation professions are as rich in heritage as that of rehabilitation teaching. The roots of the profession go back, in this country, to the streets of Pennsylvania in the nineteenth century when it was less than fashionable to be serving the handicapped. This spirit of rehabilitation teaching has provided the strength and nourishment for a developing profession, that in the twentieth century, is still experiencing the growing pains of an energetic youth. As the profession becomes more sophisticated, teachers must readily recall the fiber of simplistic dedication woven by their predecessors. When university preparation becomes the standard, a time must be remembered when the only standard was the trust bond between the visually-impaired person and the teacher. To grow honestly and confidently as a profession, the rehabilitation teacher of today and tomorrow must engender the noble qualities of the home teacher that lived, worked, and served for so many decades before.

## ORIENTATION AND MOBILITY

*This section contains two articles dealing with orientation and mobility for the visually impaired. The first, entitled "Orientation and Mobility Come of Age" was authored by William R. Wiener of Cleveland State University. The article opens with a historical perspective of developments in using the dog guide and long cane and then discusses the various techniques and procedures that have been found to be effective in implementing the goals of the efforts. The latter portion of the article deals with, among others, electronic travel aids and accreditation of university programs. The second article by Kent Tyler Wardell of California State University at Los Angeles, entitled "The Visually Impaired Diabetic and the Implications for Orientation and Mobility Instruction," contains pertinent information for all those that have contact with visually-impaired diabetics. The article begins with a historical perspective on Diabetes Mellitus. The normal body action in using food is contrasted with the abnormal body action of those afflicted with the condition. The adverse effects on the eye are discussed as well as the most effective ways for gathering information about the client. Emphasis is placed on coping with the insulin reaction and diabetic acidosis. Suggestions are made for adapting standard orientation and mobility techniques to assist such clients.*

### ORIENTATION AND MOBILITY COME OF AGE

by

William R. Wiener  
Coordinator of Blind Rehabilitation  
Cleveland State University  
Cleveland, Ohio 44115

#### Introduction

The field of orientation and mobility has reached one milestone with the celebration of the 50th anniversary of dog-guide training in this country and will soon be reaching another with the approach of the 20th anniversary of the university-based cane-travel training programs. The Seeing Eye initiated the first dog-guide school in this country in



1929 and recently celebrated its 50th year of service to blind people. The effort began when Morris Frank of Nashville, Tennessee, became aware of dog guides after reading an article in the Saturday Evening Post written by Dorothy Harrison Eustis. Mrs. Eustis was an American who had worked in Switzerland training German shepherds for combat. While in Germany she observed dog-guide training for the blind and so admired the work that she wrote a descriptive article. Mr. Frank contacted Mrs. Eustis and arranged to receive dog-guide training in Switzerland and then to return to this country. Following his successful use of the dog in the United States, Mr. Frank helped to found the Seeing Eye (Ball, 1964).

After the successful operation of the Seeing Eye, many other dog-guide schools opened their doors. Some of the earliest were Leader Dogs for the Blind in 1939 and Guide Dogs for the Blind in 1942. Leader Dogs in Rochester, Michigan, was established with the help of a group of midwestern Lions Clubs. At first, dogs were trained in a local kennel, but later the training was accomplished with the aid of a former Seeing Eye trainer. By 1972 Leader Dogs had served 2,200 blind people and had a budget of about \$600,000. of which greater than half was donated by Lions Clubs (Koestler, 1976). Guide Dogs for the Blind in San Rafael became the next largest dog guide school after the Seeing Eye. Originally it was designed to serve states west of the Mississippi but was later expanded to serve the entire country. In the early 1970's it completed a \$600,000. building and modernization program that permitted it to serve 32 students at a time (Koestler, 1976). After the establishment of these early schools the six following were founded:

- 1946 - Guide Dog Foundation for the Blind (Second Sight)  
Forest Hills, N.Y.
- 1948 - International Guiding Eye, Inc.  
Hollywood, Calif.
- 1950 - Pilot Dogs, Inc.  
Columbus, Ohio
- 1952 - Eye Dog Foundation for the Blind  
Topanga, Calif.
- 1954 - Guiding Eyes for the Blind  
New York City
- 1955 - Eye of the Pacific Guide Dogs  
Honolulu

At one point in time these nine schools were not the only ones in operation. During World War II, there were about twenty-seven schools many of which were in California. Many were fly-by-night operations formed to capitalize upon the Federal law providing money to train dog guides for blinded veterans. This state of affairs prompted the state of California to begin a Dog Guide Licensing program in 1947 (Koestler, 1976).

Instructors in the various dog-guide schools are hired by the school and trained during an apprenticeship period. After their successful performance in both training dog guides and teaching blind people to use them, they became full-fledged instructors.

### Cane Travel Training

Cane-travel instruction had its beginnings following World War II with the return of large numbers of blinded war veterans. The Veterans Administration and Services for the Blind of the Office of Vocational Rehabilitation implemented training programs that resulted in the establishment of the Valley Forge General Hospital program in Phoenixville, Pennsylvania. From this program, new ideas evolved in the delivery of orientation and mobility service. Never before had an attempt been made to apply the use of the cane to a large group of blind people. Techniques were developed and standardized that enabled the blind to travel independently. Building upon this early body of knowledge, the Edward Hines Veterans Administration Hospital continued cane-training rehabilitation when it opened the Central Blind Rehabilitation section in 1947. From this program, further innovations were made and mobility procedures were further refined and validated.

In society at this time, there was a pressing demand for those who could teach orientation and mobility. During the early and mid-50's, 176 visitors observed the program at Hines, but attempts to duplicate the efforts in agencies were unsuccessful because the personnel were not given long-term training (Malamazian, 1970). With the demand for orientation and mobility instructors continuing, in 1958 a major forward step occurred when the Office of Vocational Rehabilitation placed training of orientation and mobility instructors high on its list of priorities for personnel training needs in rehabilitation (Voorhees, 1962). In June 1959, a national conference on orientation and mobility was held at the American Foundation for the Blind in New York, with support from a grant from the Office of Vocational Rehabilitation. The conference resulted in a set of qualifications for instructors that included graduate level training, full-sighted candidates, and the philosophy that training must be at least one-year in length. The extended training was to allow the necessary emotional conditioning and the ingrainning of principles through time-consuming laboratory experience that would insure that the practitioners would be adequately prepared (Mobility and Orientation--A Symposium, 1960). Grants were made by the Vocational Rehabilitation Administration to initiate two graduate training programs. Boston College began its program in June 1960, with the aid of Father Carroll and the staff of St. Paul's Rehabilitation Center. Western Michigan University began in September of 1961 when Dean George G. Mallinson established the program with the direction under Donald Blasch (Blasch, 1971) who had been an administrator in the Hines effort. Initially, it was believed that only 100 orientation and mobility specialists would be needed to meet the needs of the blind.

This number of trained instructors was reached by August 1965. Yet the demand for trained mobility specialists was still overwhelming and the two universities were unable to keep pace with the demand. One of the largest unexpected sources of demand were the residential and day-school programs for visually-impaired children. Faced with the dilemma of shortages of qualified instructors, a meeting was held in Washington, D.C. in April 1966 to review the training programs for mobility instructors and to determine how future training should proceed. Following this meeting many additional universities were funded. Some by the Office of Education (Report on the National Conference, Ad Hoc Committee on Mobility Instructions for the Blind, 1966). In addition, the first undergraduate program was funded. The following university orientation and mobility training programs have been established since 1966:

|                                                                |               |
|----------------------------------------------------------------|---------------|
| 1966 - San Francisco State College . . .                       | Graduate      |
| 1966 - Florida State University . . .                          | Baccalaureate |
| 1966 - California State University at<br>Los Angeles . . . . . | Graduate      |
| 1969 - University of Pittsburgh . . .                          | Graduate      |
| 1970 - University of Northern Colorado .                       | Graduate      |
| 1972 - Stephen F. Austin, Texas . . .                          | Baccalaureate |
| 1972 - Cleveland State University . . .                        | Baccalaureate |
| 1972 - Alabama State College . . . . .                         | Baccalaureate |
| 1975 - Hunter College, New York . . .                          | Graduate      |
| 1975 - University of Arkansas . . . . .                        | Graduate      |

Today, we find that approximately 1,500 orientation and mobility specialists have been trained through the university programs (Blasch, Note 1). Currently, the number of orientation and mobility specialists graduated each year is equal to the number of positions available (Welsh and Blasch, 1974).

Standards Within the Profession

Since the mid-1960's, the field of orientation and mobility has had many accomplishments in its quest toward providing quality service for the consumer. One of the earliest attempts toward this goal was the development of certification for orientation and mobility specialists. During the 1960's, the field of blindness in general, became concerned with upgrading its services through the establishment of accreditation of agencies and residential schools serving the visually handicapped. Beginning as early as 1954, the American Association of Workers for the Blind awarded a Seal of Good Practice to those agencies that maintained service in accord with the newly established Code of Ethics (COMSTAC, 1966). By the late 1950's it had become clear that this noble effort lacked the administrative machinery to be an effective means of upgrading service. The American Foundation for the Blind in 1961 commissioned a study for the purpose of determining if national accreditation was desirable and, if so, how it might be implemented. The study resulted in the formation of the



Commission on Standards and Accreditation (COMSTAC) whose purpose was to develop standards in the areas of administration and provision of services. A final outcome of the commission was the COMSTAC Report in which standards for orientation and mobility services together with those for other service areas were clearly outlined (COMSTAC, 1966). Also within Appendix B of the COMSTAC Report was a call for action in the field of orientation and mobility to "choose an appropriate body" to develop certification standards and procedures. At that point in time the field of orientation and mobility had already developed two professional organizations, interest Group No. 9 of AAWB and the Mobility Interest Group of the American Association of Instructors for the Blind, AAIB, both for the purpose of sharing knowledge and developing policy (Wiener and Welsh, 1979). The AAIB later became the Association for the Education of the Visually Handicapped--AEVH. Interest Group No. 9 of AAWB, aware of the challenge by COMSTAC to develop and implement certification, decided to accept the responsibility. At the organization's second national meeting in July 1966 at the AAWB Convention in Pittsburgh, Pennsylvania, Warren Bledsoe initiated a course of action leading to certification by moving to pursue establishment of a process that would help insure "safe and effective mobility instruction." The motion was adopted and the first certification committee, consisting of Gerald Mundy, Wilma Spoke-Seelye, Stanley Doran, John Malamazian and James Doyle, began a year-long process to formulate standards of service (AAWB Group No. 9 minutes). At the 1967 meeting of the Interest Group in Miami Beach the standards were accepted and a new committee consisting of Martha Rosemeyer, Larry Blaha, Monica Cain, Robert Long, Stanley Suterko, William Walkowiak and Marvin Weesies was selected to investigate a procedure for implementation of certification. The machinery of certification became a function of AAWB but with input from AEVH. In July 1968 in Toronto, Interest Group No. 9 accepted the committee report and presented a resolution requesting establishment of the certification process to the Board of Directors of AAWB. Implementation was swift and the first mobility specialists were certified by AAWB in Chicago in July 1969 (AAWB Group No. 9 minutes). The field had taken a giant step towards insuring that those individuals providing service would possess adequate competencies and personal qualifications. In order to further insure the effect of certification, Interest Group No. 9 formally requested the National Accreditation Council, an organization that grew out of the COMSTAC Report, to require certified instructors in agencies granted accreditation. Over the years the certification standards have been dynamic, keeping pace with changes in the field.

Another accomplishment was reached in 1972 when Interest Group No. 9 established an Ad Hoc Committee to determine the desirability and possible development of a Code of Ethics for orientation and mobility specialists. The committee headed by William Wiener and consisting of Richard Welsh, Everett Hill, Robert LaDuke, Robert Mills, and Gerald Mundy sent out questionnaires to members of Interest Group No. 9 requesting information on whether or not a code was needed and if so what components might be necessary within such a code. Following a positive response from the field,

a code was formulated and presented to the Interest Group in July 1973 in Cleveland. The code was adopted but formal enforcement was postponed for further study (Wiener, et al., 1973). In July 1975, the Interest Group voted to initiate a national registry of mobility specialists who subscribe to the code. Most recently, subscription to the code of ethics has become possible during application for certification. With the passage and acceptance of the code of ethics, the profession has moved closer to providing the highest quality service by encouraging the instructor to practice within the boundaries of respected principles (Welsh and Wiener, 1977).

### Competencies Needed for Successful Orientation and Mobility

In the beginning days of orientation and mobility instruction, there were those who believed that the role of an orientation and mobility specialist was that of a technician. If one observed the work of a mobility specialist in a cursory fashion, instruction in use of the cane appeared to be the only service that was provided. From such cursory observation, it was not always clear that many equally important components were also being taught to the visually-impaired traveler. Today it is accepted that as many as seven components are essential for a visually-impaired individual to travel safely, effectively, efficiently, and independently.

#### Low vision

The use of low vision is of paramount importance for the partially-sighted traveler. The great majority of our information about the environment comes to us through our vision. The sense of sight is the most efficient means of gathering and transmitting information because it is capable of communicating a large amount of information quickly and over long distances. When sight is not functioning at peak capacity due to impairment, the individual is forced to learn to use limited vision and to learn to employ other sense modalities to bring in the information not available through sight. It has been estimated that as many as 80-90% of blind people have some residual vision and therefore many can learn to make use of this information. The visual system, when impaired, can distort or provide partial information through a reduction in visual acuity, visual field or both. For the visually-impaired individual to become as effective a traveler as possible, he or she must begin using this distorted or partial information for independent movement. Only rarely is this information detrimental to the blind traveler. In those few instances when a very minimal amount of vision interferes with acquisition of other skills, occlusion may be used as a temporary training aid. The traveler, however, must learn how to integrate visual information with the other remaining senses. Visual training commonly takes on two forms--visual stimulation and optical-aid training. In visual stimulation the partially-sighted individual



learns to interpret the distorted and missing information through a combination of using physical skills and perceptual skills. In the first category he or she learns more effective skills in fixation, accommodation, tracking and adaptation. In the perceptual category the person learns attending, figure-ground relationships, constancy, spatial perception, discrimination, identification, form perception, and visual memory.

Visual-stimulation training of both near vision and distance vision can be accomplished initially with table top tasks later followed by visual training in real environments indoors and out. Optical-aids training is the other major method of improving visual function. The individual who has mastered the physical and perceptual skills can learn to use optical aids that will further enhance his or her ability to interact with the environment. Near-vision optical aids such as hand-held magnifiers, microscopes, and stand magnifiers can be used to read maps, telephone directories and store directories. Distance-vision aids such as field glasses, hand-held telescopes, and bioptic lenses can be used for such diverse activities as reading room numbers, outdoor signs, street names, addresses, store signs, bus names and as an aid in crossing stop sign and stoplight controlled streets, viewing landmarks, and visually clearing a pathway. The optical aids function through angular magnification by enlarging the image so that it is projected on more of the retina. This method of increasing image size also results in specific problems that require the user to use the aid only in a static position (Blasch and Apple, 1975). This is because the aid causes reduced visual field, distorted depth perception, magnified speed, and magnified image shaking during movement.

### The Other Remaining Senses

The blind individual must also have competencies in the use of the other remaining senses. Dog guide and cane travelers alike must make use of their remaining senses to gather the necessary information about the environment to judge relationships among significant objects. Without this information orientation would be impossible and the traveler would be unable to locate objectives. The senses consist of nerve endings or receptor cells that react to specific kinds of environmental agents, such as the retina to light and the cochlea to vibration. The lay public generally identifies five senses to include vision, hearing, smell, touch and taste. A careful examination of the senses uncovers an additional ten that include perception of heat, cold, pressure, vibration, pain, proprioception, rotation, balance, acceleration and deceleration.

With the loss of vision, hearing becomes the most important sense for the visually-impaired traveler. For both sighted and blind, hearing provides the everyday functions of facilitating communication and socialization, and acting as a warning system. For the blind, however, hearing takes on special importance as it is used



to explore the environment. Like vision, hearing can be a long-distance sense that can tell the individual about distant objects. The traveler learns to identify sounds that are helpful for orientation. Localization is used to further pinpoint one's position in relation to a sound source. Localization of moving objects or sound tracking permits judgments about traffic patterns that allow sophisticated movements including street crossings (Wiener, 1979). Reflected sound from one's footsteps or other sound sources can also be used to detect the presence of large objects and determine the location of intersecting hallways within a building. This ability in the past has been identified as a sixth sense or facial vision but in reality is due to higher frequencies of reflected sound as one walks near an object and lower frequencies as one passes an opening (Worchel and Dallenbach, 1950).

The olfactory sense is also a long distance sense but provides much less exact information about location. It is dependent upon atmospheric conditions and may not always carry the information to the individual. Nevertheless, the olfactory sense, when used with other senses, can be quite effective in providing information for orientation. The blind traveler may be able to detect the presence of a bakery, gas station or other establishments that have a specific olfactory clue. Indoors in a shopping mall setting, with all the doors of the shops open, the sense of smell can provide an array of aromas that can be especially helpful.

The sense of touch is a short distance sense but can provide a wealth of information about the immediate surroundings. Using this sense the blind traveler must piece together small elements of his environment to gain a more complete picture. The traveler can, however, learn to interpret different textures and surfaces under his hand, his feet or his cane to determine or verify his location. In a building the surface texture of a wall sampled by a trailing hand can be used to identify a particular part of a building while the floor surface can be equally helpful in a similar fashion. Closely related to the sense of touch is the sense of vibration and pressure. The blind traveler, using a cane, can learn to discriminate between similar textures such as those of cement and asphalt by identifying patterns of vibration transmitted up the shaft of the cane to the hand. Similarly, when the cane is used to touch and slide on the ground, resistance to the ground surface may produce various pressures against the hand surface. Also, closely related to the sense of touch are the senses of heat and cold. Receptor cells within the skin allow the blind traveler to detect changes in temperature that can be helpful for orientation. Locating the heat produced by sunlight can, for example, help determine direction. The cooling sensation under an awning or tree can serve as a landmark for a specific location.

Proprioception is the sensing of the tension of the muscles and position of the limbs through receptor cells located in the muscles, joints and ligaments. This sense provides information about the position of the body and, when combined with the vestibular sense

provides information about body position and movement that is necessary for accurate orientation.

The vestibular sense consists of a sacculus, utricle and three semicircular canals located within the inner ear. The sacculus and utricle help the individual detect any deviation from the vertical position while the semicircular canals set at right angles to each other detect rotary motion, linear motion, vertical motion, and acceleration and deceleration (Carlson, Johnson, and Covert, 1965). Vestibular information can be most important for independent movement when used in conjunction with proprioception, helping the individual maintain an upright posture, determining when one is walking on an incline, decline, lateral tilt and determining how much of a turn he or she has just made. In fact, the vestibular-based sense of rotation may in part be responsible for the layman's conception of a sense of direction (Gibson, 1966). A so-called sense of direction however, would seem to be a perceptual system combining an integration of the various sense modalities.

The congenitally-blind traveler often will have developed the use of the remaining senses and may not require extensive training other than to refine the usage and point out how the senses are bringing in information. The adventitiously blinded individual on the other hand often lacks confidence in the use of his senses and requires more extensive training.

### Concept development

A conceptual understanding of one's body and one's environment is another competency essential for independent travel. Concept development goes hand in hand with use of the remaining senses because concepts are based on first-hand experiences that are a result of sensory involvement. A concept is an abstraction based upon percepts that is used to classify different objects by their common properties. A percept can be identified as an impression of an object gained through sensory channels. Sensory experiences are therefore essential for meaningful formation of concepts. A blind child, for example, cannot learn to classify four sided objects as squares or rectangles solely through a verbal description of their common properties, but instead the concept must be learned in a first-hand manner through direct experiences.

A vast array of concepts is necessary for independent travel to be successful. Before one learns about the surrounding world, one must begin with his own body. Laterality and directionality begin with an appreciation of the body as a base of reference. Once this is accomplished, right and left and cardinal directions can later be understood. The body concept often begins with the labeling of body parts, planes and movements (Cratty, 1968). Concepts such as shoulder level, waist high, and center are necessary before techniques of independent movement can be mastered. Relationships of the body to the environment pave the way for more complex judgments about position in the environment during independent movement.



Another concept that is a prerequisite for orientation and mobility is that of shape. The child who is asked to travel within his school room must grasp the concept of the shape of the room. He must understand that the room typically has four sides before he can predict locations of objectives and determine his relationship to objects within the room. This basic understanding begins with experiences with solid geometric shapes. Later the child learns that the environment is constructed of combinations of various shapes from tables and chairs to the square of the block.

An understanding of relationships among objects is another prerequisite essential for orientation and mobility. Below, behind, in front, between and single file are examples of concepts of relationship that become important for independent mobility. In following a sequence of fixed objects, their relationships to one another must be understood. Similarly, the concept of comparison of objects is necessary. Straight, curved, rough and smooth are examples of comparisons that are useful when traveling along a route.

The concept of spatial relationships is one of the most basic, but among the most difficult, to master. The blind traveler, in order to be able to choose alternative routes to the same objective must understand such concepts as parallel and perpendicular. Hallways within a building can run parallel or perpendicular to each other, and the traveler must understand that to get from one parallel hallway to another it is necessary to travel along a perpendicular hallway. Similarly, outdoors, this concept must be projected to the larger environment. An understanding of the grid pattern of the outdoor environment is essential for independent travel. One must be able to predict the layout of streets in order to locate objectives.

Concepts of indoor architectural structure are also necessary. Elevators allow vertical movement while escalators allow floor to floor movement in a diagonal fashion. Stairs similarly need to be understood so that the blind traveler can differentiate between stairs that turn 90 degrees at landings from those that continue in the same direction. In the first case, the individual will end up in the same relative location on the floor above or below whereas in the second example he will end up in a relatively new location on the upper or lower floor.

The concept of moving objects is paramount for safe travel outdoors. The blind traveler must understand traffic patterns and rules of traffic flow so that he can determine when it is safe to move. The systems of cars keeping to the right, methods of making turns, and traffic control must be understood.

Geographical concepts are important but difficult to attain. North, south, east and west are not related to the individuals own body, but instead are permanently related to the environment. Because they are more abstract they are more difficult to learn. Once acquired the complexity continues with such questions as, "How can a north-south street have an east and west side?" "Why is the



southwest corner of the block the same as the northeast corner of the intersection?" and, "How can one walk south through a north door?" Once mastered, however, geographical directions facilitate more complex routes and sophistication of travel.

The list of necessary concepts seems endless. Distance, time, the nature of sounds and odors, and many more concepts must be understood. The blind child must have first-hand experience using various sense modalities to learn concepts that the sighted child learns more easily using vision. If a child has not had the appropriate experiences, he or she will require special training in concept development.

### Mental mapping

The visually-impaired traveler must develop an understanding of spatial awareness and use this knowledge to organize the environment. Each individual needs a functional mental representation of the environment through which he will be traveling. Building upon the concept of spatial awareness the traveler must learn to organize space by building a mental construct of the intricate relationships of the hallways or streets to each other. This network of hallways or streets provides a framework allowing the individual to plan one or more routes of travel to an objective. Without such a framework one would have to memorize a sequence of turns and would be limited to rote travel. It is unclear what type of imagery the visually-impaired might employ for this mental map. A congenitally-blind individual certainly is unable to use visual imagery. If one loses his vision before age six he cannot form visual memories (Schaegel, 1953). The congenitally-blind individual therefore must turn to another sense modality upon which to base his perception of the environment. The adventitiously-blinded individuals on the other hand can make full use of visual imagery in organizing space. With practice the traveler can learn to picture the environment in order to plan routes of travel. As the individual travels through the specific route he can also visualize the environment as he proceeds. As an aid in acquiring a mental representation, tactile and auditory spatial maps have been used (Blasch, Welsh, Davidson, 1973) (Bentzen, 1977). A tactile map can be made of any material that can be read and interpreted easily. The map is read by scanning the material so that the traveler can piece together the various parts to obtain a complete picture. The reader must be skillful in reading braille, interpreting map symbolism, using compass directions, and understanding scale and must understand concepts of the environment. An auditory map is a verbal description of a specific geographical area. The map usually begins with an overall description of the area including landmarks, information points and clues. The auditory map does not require a knowledge of map symbolism or braille reading skills, and allows the incorporation of a great deal of detail including, possible dangers and suggestions for specific travel or orientation procedures. Often a tactile and auditory map can be combined for enhanced learning. Early experiences with these maps are designed to improve spatial awareness.

## Psycho-social and cognitive competencies

Psycho-social and cognitive competencies are essential to optimal orientation and mobility. The blind traveler, by using a dog or cane, advertises his handicap to the public. By holding the dog's harness or swinging the cane he loses his anonymity and is thrust into the spotlight. He can no longer travel unnoticed in crowds and instead is subject to the attention of the public. With this notoriety comes the realization that many of the sighted public view him as being "different."

An individual's self concept is, in part, based on his interaction with others (Festinger, 1957). Therefore, an individual's self-esteem can be negatively affected if others relate to him in an atypical manner. The blind traveler comes in direct contact with the public and therefore must be prepared to deal with the attitudes of the sighted as he moves through the environment. Often the individual will feel the effects of stigma as he encounters the avoidance, over-protection, and at times, rudeness of fellow pedestrians.

The blind traveler must also be prepared to communicate effectively with the public in order to travel independently. The traveler will want to learn how to refuse assistance when it is not needed and accept help when it is. At times, the traveler may have to seek information or help aggressively to reach his objective. When specific information about his or her present location or immediate objective is not known, he or she will have to make contact with another individual and direct the conversation so that he or she obtains the necessary information. The same may be necessary when planning for, and riding public transportation. The individual will often have to secure information over the telephone in planning bus transportation and then will need to seek specific information from the bus driver regarding the destination of the bus and the correct stop for exiting.

In the training situation the instructor must be sensitive to all the above mentioned needs and help the individual deal with the attitudes of others and successfully interact. Discussion sessions, role-playing activities and experiences in the real environment become useful tools for the instructor.

Cognitive skills of analyzing a situation and making the appropriate decision are essential for independent travel. The blind traveler is called upon to make complex decisions on which hinge success or failure. He or she must analyze incoming sensory information and decide on his location. He or she must make life and death decisions, for example, if he or she is in alignment to parallel traffic and when to cross a traffic light controlled intersection. At times he or she must recognize that he or she is not where one should be and must take steps to recover. Often a previously planned route will not be possible and the traveler must decide upon an



alternative. Cofer (1966) identifies decision making to include recognizing the problem, looking at alternatives, and making the correct decision. The blind person who may not have been independent previously may lack the problem-solving skills or may lack confidence in his decision-making abilities.

The orientation and mobility instructor tries to prepare the individual for interaction with both the public and decision making in three ways (Welsh, 1972). First, a sequence of lessons of graduated difficulty is planned so the traveler begins in an uncomplicated area with much instructor involvement and little responsibility for independent movement. Gradually, the individual is exposed to more complicated areas requiring more decision making and must take on more responsibility. This is necessary as the instructor gradually removes himself from the traveler. Second, instruction takes place in real environments where everyday problems occur that require the traveler to analyze the problems and find solutions. Also, in the real environment the traveler must learn to communicate with the sighted public and use the public when necessary to gain information. Finally, the individualized instruction permits a close relationship to develop between the traveler and the instructor. The relationship is intense and helps the individual deal with negative psycho-social variables such as fear and anxieties. The individualized instruction also allows the instructor to follow the thinking of the client and help him with problem solving.

### Kinesiology

Kinesiology, or the understanding of human movement, is another component in successful orientation and mobility. The visually-impaired traveler must have an understanding of his body movement in order to travel efficiently from place to place. As mentioned earlier, concepts of the body are a starting point for movement. Various components of body movements must be understood and often improved to travel efficiently. These components include physical strength, endurance, coordination and agility. Hand-in-hand with these abilities are the development of adequate posture and gait. The way one carries him or herself affects the various components and ultimately his movement through the environment. Often a congenitally-blind individual may modify normal posture and gait to gain greater stability in an unknown environment. While the modifications serve the purpose of reducing the chance of falling, they have the adverse effect of causing muscular imbalance and can even affect the ability to walk a straight line. The use of a guidance device often in combination with remedial exercises can provide the necessary input to affect a change in defective posture and gait (Miller, 1967).

The mobility specialist aids the individual by evaluating posture, gait and various psychomotor abilities. Exercises of a general nature can be provided to improve the overall picture. Exercises for general posture improvement, straight line walking,



range of motion, strength, coordination, agility, and endurance can be provided. The mobility specialist often consults with, or refers the client to, a physical therapist when more severe posture or gait deviations occur.

### Mobility techniques

The final component of independent travel may require mobility techniques including the use of a guidance device. The blind traveler must have two kinds of environmental information. The first is information about the immediate area to allow safe movement by providing knowledge of the terrain ahead, presence of obstacles, drop-offs, step-ups, and other hazards. The second kind of information is data about objects in the environment farther off in the distance such as the presence of buildings, poles, other people, and vehicles. Information about both the immediate environment and the more distant environment must be combined to provide safety and orientation. The cane and the dog guide serve as guidance devices that provide information primarily about the immediate environment. The cane is used as an extension of the sense of touch allowing the individual to feel the path in front before stepping ahead. It serves as a probe and obstacle detector, supplying the necessary information for movement. The dog supplies similar information in totally different ways. Being a visual, auditory, and olfactory animal, the dog gains information through these senses and transmits it to the traveler by way of a rigid U-shaped harness. When the animal finds a drop-off, he stops and thus signals through the harness the presence of the drop-off. When the dog changes his path, he is signalling that an obstacle is in the way and he is moving around it.

Mobility techniques consist of various possible phases beginning with indoor skills and culminating in downtown travel. Training takes place in real environments and consists of a sequence of lessons graduated in sensory processing, route complexity, and responsibility. The phases of training with cane or dog guide are basically parallel. However, in dog guide training, the indoor skills are learned with a dog, whereas in cane training the indoor skills are learned prior to obtaining a cane. These skills are known as pre-cane, or more accurately basic skills and are intended to be used in a controlled familiar environment. In less controlled or unfamiliar indoor environments indoor cane skills are required. Later, the dog guide traveler or cane traveler learns to travel in residential areas, crossing nontraffic light controlled streets. Progressing into semi-business travel, the individual learns to cross streets controlled by traffic lights, to walk on moderately traveled sidewalks, and locate places of business. Next, the individual learns to travel in the downtown area. In this phase he learns to cross extremely busy streets, walk on heavily congested sidewalks, and travel in department stores. Usually, during downtown travel, the individual learns to use public transportation. Mall travel and rural travel are skills which also may be added.

## Electronic Travel Aids

For many years, it has been the desire of blind people to be able to extend further their abilities to sense the environment. Normally, direct sound and also ambient sound that has been reflected back by objects have been used to gain information. However, this source of information has its limitations. At long distances objects that do not emit sounds cannot be detected. Reflected sound can only be used to find objects at close range. Therefore, the blind traveler may not be able to detect the presence of poles, trees, fences, and other objects that could provide useful orientation. Another limitation has been the inability of reflected sound to provide information about the properties of the object that are nearby. Little discrimination between various objects through reflected sound has been possible. It has further been impossible to track moving objects that do not emit sounds. Therefore, pedestrians on the sidewalks or crossing streets could not easily be used as sources of information and, in fact at times, have been obstacles with which to contend. Other problems focus around small objects such as low tree branches and signs projecting from poles that escape detection through reflected sound but are often struck by a cane traveler. A further source of discontent has been the inability to use reflected sound from building lines to detect occasionally one's position on a wide sidewalk as in a downtown area. If a blind traveler gets close enough to the building line to hear its presence, he will often encounter standpipes and window shopping pedestrians. Finally, those individuals with hearing losses have had even greater difficulties in using sound to sense the environment. In summary, relying upon sound to sense the extremes of the immediate environment and to protect the individual from objects above the area scanned by the cane, has not been as effective as one would wish.

At the present time, orientation and mobility is beginning to extend the sensing abilities of blind individuals with environmental sensors. These are devices known as electronic travel aids that emit artificially generated energy to scan the environment and return information about the existence, range and location of objects and with some devices even surface characteristics of the objects.

### History of electronic travel aids

Advances in technology, beginning primarily during World War II, paved the way for development of electronic travel aids. The wartime Office of Scientific Research and Development helped create the National Research Council's Committee on Sensory Devices. This committee helped stimulate activity on electronic travel aids. Research on devices was undertaken in places such as the American Foundation for the Blind in New York, the National Research Council of Canada, Science for the Blind at Bala Cynwyd, Penn., the Sensory



Aids Evaluation and Development Center at MIT, St. Dunstan's in London, Stanford Research Institute, the University of British Columbia, the University of Canterbury in New Zealand, the Prosthetic and Sensory Aids Service of the Veterans Administration, and by several independent inventors. Over the years more than twenty electronic travel aids have been developed. During this time, devices have been engineered to function by either scanning the environment with electromagnetic radiation in the form of visible, infrared, or laser light; or sonic energy in the form of either audible or ultrasonic energy (NAS, 1972).

Many of the early devices obtained information by gathering ambient energy. Such passive environmental sensors responded to the presence of light or sound (Rotterdam Conference, 1965). An early light gathering device called Passive Optical Spectacles contained photosensitive cells that received ambient light and changed, or transduced it, into audible sound. Another passive device, the "Bles" or Bishop-Lucas-Environment-Sensor was in the shape of a mail tube and gave an auditory display or signal to account for differences in light intensity resulting from position in the environment. Examples of other devices using ambient light included the 80 channel and 120 channel Eleckroftalm, and the Tactile Vision Substitution System. These devices use cameras that change light into a tactile display. Early passive sonic devices consisted of specially designed hearing aids. One such device, the Pan Audio System, used binaural hearing aids that automatically increased their gain following a pulse of sound to pick up reflecting echoes.

Later, Active Energy Radiating Systems that were developed scanned the environment with artificially-generated energy (Rotterdam Conference, 1965). One of the first electromagnetic devices was the Witcher from MIT. It was a hand-held device mounted in an attache case. Light that scanned the environment was transduced into a tactual stimulus. Another sensor, the G-5 (Guidance Device 5), used pulsed light that was detected by a photocell as it returned to the user. It was a hand-held device that produced tactual stimulus. The laser cane that uses three pencil thin laser beams to detect obstacles in one's path, at face level, and detect drop-offs evolved later from this device.

One of the early sonic active energy radiating devices, the Kohler Sound Generator, emitted energy in the audible range in the form of low- and high-frequency clicking. This sound was used to detect the presence of objects by allowing the individual to hear the reflected sound. A similar device, the Witcher Audio Frequency Obstacle Detector, sent out pulsed sound at 10,000 Hz. Future development of sonic devices led to instruments that emitted ultrasonic or inaudible sound. These devices either used pulse modulation or frequency modulation as a means of controlling the signal. Examples of early pulse-modulation systems were the Stromberg-Carlson and the Hoover Super Sonic System (Rotterdam Conference, 1965). The present day devices operating with pulse modulated frequency control are the Russell Pathsounder, Mowatt Sensor, and Nottingham Obstacle Detector.



The frequency-modulated systems consisted of devices such as the Ultra Sonic Aid by Westinghouse and the Ultrasonic Torch by Kay. These devices differed in the way they were carried or worn and in the way information was displayed, but each emitted an inaudible sound spectrum that was transduced back into audible sound at the ear or into other modalities such as tactual stimulation. The present-day device using frequency modulation evolved from the Ultrasonic Torch and is known as the Sonic Guide.

Over the years, the attrition rate for devices has been high. At present, only four have evolved into electronic travel aids that are available in the commercial marketplace. These devices are the C-5 Laser Cane, the Russell Pathsounder, the Sonic Guide and the Mowatt Sensor. A fifth, the Nottingham Obstacle Detector, may soon be available in this country. With the exception of the laser that is built into a cane, the other devices are designed to be used as a supplement to a cane or dog, bringing in information farther out in the environment. Of the five devices, the Laser Cane uses coherent electromagnetic energy whereas the others function with ultrasonic energy. Each of the devices functions differently and provides different amounts of information to the user. The more sophisticated the device, the more information provided, but also the more difficult it is for the user to interpret the information. Therefore, each device will be useful to a different population. Those with the need for more information and the ability to process it will turn to the more sophisticated devices.

### The Sonic Guide

Among the currently available devices, the Sonic Guide provides the most sensory information. It has evolved from the earlier Ultrasonic Torch. Developed by Dr. Leslie Kay of Canterbury University in Christchurch, New Zealand, the device is a spectacle-mounted frequency-modulated ultrasonic sensor. Since being developed in spectacle form, the device has gone through three model changes. Initially, the prototype was tested in New Zealand and Australia in 1969. Instructors trained fifty blind people and decided that the device was useful and should be made available through training programs conducted by professionally-trained orientation and mobility specialists. In 1970, Canterbury University enlisted Warmald Vigilant Limited in Christchurch to make 30 prototypes for evaluation in New Zealand, Australia and eventually the United States. Between 1970 and 1974 support from the Veterans Administration and the Seeing Eye Incorporated allowed further testing of the device and in 1974 the first production models were made.

In January 1976, a new company, Warmald International Sensory Aids Limited, was established for the purpose of manufacturing and marketing the devices. In the United States, Telesensory Systems, Inc. of California handled the service and marketing of the aid. The distributor currently estimates that approximately 134 visually-impaired people in this country now use the Sonic Guide (Daily, Note 2).

The device is composed of an ultrasonic transmitter and two receivers mounted on the bridge of spectacle frames. The power source and electronics are in a special control pack attached to the spectacles by a cord. The pack is worn on the body and is the size of a pack of cigarettes. The lower section is a removable rechargeable battery.

The transmitter is directional and emits ultrasonic sound in a beam that is about 90 degrees or 45 degrees left to 45 degrees right. The intensity of the beam is gradually reduced as it moves away from the center point whether to the sides or above or below. The sound emitted from the device, when reflected back, is received by two high-frequency directional microphones that are angled to the right and left. This positioning allows reflections returning from the right side of the environment to produce a greater stimulus in the right microphone and vice versa. Ultrasonic reflections received by the microphones are transduced into audible frequencies that are delivered to each ear through tubes that lead to open ear molds. The molds allow ambient environmental sounds to also be heard. The Sonic Guide produces two independent channels, one for the left and one for the right. The individual using the device binaurally thus has the advantage of comparing signals reaching the two ears. When the reflection comes from one side of the environment, one microphone will be stimulated more directly than the other resulting in a slightly louder signal from that microphone. The individual learns to detect these differences and localize the position of the object reflecting the ultrasonic sound. The user is taught to turn his or her head and scan in order to accurately localize position. When the sound is equally intense in both ears, it is perceived as emanating from directly in front.

Judgment of distance to an object is possible with the Sonic Guide by recognizing the pitch of the reflecting sound. Any object within the beam of the device produces a single tonal sound that is directly proportional to the distance between the transmitter and the reflecting object. The higher the pitch, the further the object is from the individual. The frequencies used are reported to be between 300 Hz. and 6000 Hz., providing a working range of from 50 centimeters to about 5 meters. The manufacturer reports that each time the distance to an object is doubled the pitch of the sound is increased by one octave. In practice, distinct changes in pitch occur at cane-reaching distance (about 6 feet) and arms length. To travel gracefully, however, one must avoid obstacles prior to touching them with the cane. This means that the individual must attend to the higher sounds that indicate that the objects are farther away.

The Sonic Guide can also be used to determine the nature of an object. The shape and surface characteristics can be determined by the intensity of the signals returned from the reflecting object. Materials that are hard, such as wood, metal, concrete or glass, reflect practically all the incident ultrasonic sound. Soft materials, such as cloth, absorb a large amount of the ultrasonic energy. Therefore, strong reflecting signals generally suggest hard materials



whereas weak signals suggest soft material. The texture of the surface also has an effect on the returning signals. Rough surfaces present many facets which tend to send back separate signals from many points. The surface shape also affects signals. Flat surfaces send back strong signals whereas convex surfaces provide less reflection and weaker signals. With this information in mind, the blind user after many hours of training can learn to distinguish different surfaces and shapes.

### The Russell Pathsounder

The Pathsounder was developed by Lindsay Russell with the assistance of the Sensor Aid Evaluation and Development Center at MIT. The device is strapped around the neck and worn on the chest. It emits ultrasonic pulses that, when returned to the device by a reflecting surface, are changed into audible or tactile stimuli. The beam is pear-shaped and is intended to protect the individual from waist high to the top of his head therefore complementing the use of the cane. When an object is 6 feet away the Pathsounder can be set to produce a buzzing sound or a vibrotactile stimulus on the back of the neck. When the distance between the device and the object is 32 inches or less a high-pitched beeping occurs or, if vibrotactile stimulus is selected, a vibration on the chest is felt. A special ramp function makes buzzes from more distant objects sound fainter giving primary ranging.

The application of the device includes protection from overhanging objects, finding an open space in a crowded area, sensing walls to the side and finding and avoiding pedestrians. Application in addition has been made with wheelchair bound individuals. The device is manufactured and distributed by Lindsey Russell. To date, according to Russell approximately fifty individuals are using the device (Russell, Note 3).

### The Laser Cane

The Veterans Administration supported research by J. Malvern Benjamin and his associates at Bionic Instruments (Mims, 1973) for developing a laser-beam sensor. Evolved from the G-5 obstacle detector, the laser sensor was incorporated into a cane. The first production devices were manufactured and field tested in the late 1960's. The laser cane underwent several model changes before the latest, the C-5, came into existence. All the electronic components of the C-5 are in its upper section. The cane has three gallium arsenide injection lasers (low output) that emit pulses of coherent infrared radiation into the environment. These beams of focused radiation are extremely thin and allow precise scanning of the environment through moving the cane in a touch-technique procedure. The main source of information is the middle beam that can be switched to detect objects at 5 or 12 feet. Upon striking an object in the environment the beam is reflected back to a receiver lens behind which is a photodiode that



detects the returning radiation. The energy is changed into a vibrating tactile stimulus and if desired an audible tone of 1600 Hz. indicating the presence of the object. The angle of the returning radiation is related to the distance of the object using the principle of optical triangulation. The cane also emits upper and lower beams that in turn can provide an upper tone of 2600 Hz and a lower tone of 200 Hz respectively. The upper beam functions in the same manner as the middle beam but is intended to signal the presence of a high object at a distance of 30 inches to a height of 6 feet from the ground. Often this information can be combined with the middle beam to provide extra information concerning the distance of a tall object. The lower beam operates in a manner opposite to those of the other beams. In this case the cane only emits the low pitched tone when the low beam does not return to the cane. This feature was designed to allow the cane to detect drop-offs such as stairs and curbs from a distance of 6 feet. The low beam is prevented from returning to the cane by the edge of the drop-off and therefore triggers the audible tone.

The application of the cane allows a blind person to walk with the knowledge that he or she will be able to detect objects in one's path before physical contact is made. In addition, the part of the body above that which is protected by a regular cane will also be protected. Drop-offs can also be detected well ahead of cane contact. Finally, the space to the side of the traveler can be sensed by modifying the movement of the cane. This permits location of openings in the hallways or sensing of a building line without the necessity of tactual contact.

The cane is being produced and distributed by Nurion Inc. and according to Nurion approximately 85 blind individuals use the device (Sharko, Note 4).

#### The Mowatt Sensor

The Mowatt Sensor is a pulse-modulated ultrasonic sensor that was developed by Geoff Mowatt, a retired electronics engineer in Auckland, New Zealand. The device was developed in 1970 as an electronic cane with a tactual button in the handle for display of information. Later the entire cane handle was made to vibrate. Finally in 1972, the device was rebuilt into a hand-held sensor that vibrates in response to the presence of an obstacle. The Mowatt Sensor sends out pulses of ultrasonic sound in an elliptical cane from its emitter. In the presence of an object, reflected ultrasonic sound returns to the aids receiver and is changed into vibratory information. The device provides precise range information by vibrating faster as the distance between the object and device decreases. At a distance of 13 feet the traveler experiences a vibrating rate of 10 vibrations per second while at 3.3 feet it increases to 40 vibrations per second. An earphone can be used for those with impaired tactile functioning. The device responds only to the nearest object and can be set for a sensitivity of either 13.2 feet or 3.3 feet. The Mowatt

Sensor is approximately the size of a 110 camera (6 inches by 2 inches by 1 inch) and can be carried in one's pocket or purse. The device was evaluated in New Zealand and in 1976 a decision was made to produce it through Wormold International Sensory Aids, Ltd. It is currently marketed through Telesensory Systems, Inc.

The Mowatt Sensor is designed as a situational aid for specific instances when more environmental information is needed. Because the device has a fairly narrow beam it is recommended that a scanning procedure be used to gain maximal information. Typical applications include searching for landmarks such as poles, benches, fences, locating doorways, sensing building lines without tactually trailing, locating pedestrians, and following a line of people. According to the distributor, approximately 140 visually impaired currently use the Mowatt Sensor (Daily, Note 5). The popularity of this device stems from the fact that it requires less training than more encompassing devices and is considerably less expensive, costing \$500 for the users kit.

#### The Nottingham Obstacle Detector (NOD)

The device under development and likely to become available soon is the Nottingham Obstacle Detector. Developed in England at Nottingham's Blind Mobility Research Unit, the device is a hand-held situational aid that, like the Mowatt Sensor, will be used only when specific information is needed. It emits a narrow beam of ultrasonic pulses that when reflected back by an object is changed into an audible signal. The signals correspond to musical notes that indicate ranging information. The device functions over a 7 foot range and provides one note for each 12 inch zone. As the distance between the NOD and the obstacle decreases, the notes go down the musical scale. An earphone is also available for silent operation. The device responds only to the nearest object. Applications for this particular device are similar to those of the Mowatt Sensor. The NOD is manufactured by D. Ross Electronics in England (Marsh, 1978).

#### Future Directions

#### Electronic travel aids

In this country preparation of personnel to teach electronic travel aids began in 1971 when Boston College held training for university faculty. In the fall of 1974, Western Michigan University held the first University training program in this country offering electronic travel aid instruction to mobility specialists in the field. In 1975, an instructor-training program was offered by Boston College, in 1976 by San Francisco State University, and in 1978 by Cleveland State University. Presently, other university orientation-and-mobility training programs are considering offering courses in electronic travel aids.

At the present time, electronic travel aids have great potential but are underused. The combined estimates of the distributors places the number of users at approximately 409. It is not clear why there are so few users but several possibilities exist. First, it may be that some of the devices require too much interpretation by the user. Certainly the more sophisticated devices require the user to attend to many stimuli or variations in stimuli at one time. The extensive training necessary with some of the devices reflect the need to learn to process all the incoming information. Second, the cost of the devices may be prohibitive for many individuals. Prices range from \$500 for the Mowatt Sensor to approximately \$2,400 for the Laser Cane and Sonic Guide. State Commissions for the Blind only infrequently have provided funds for such aids in the rehabilitation process. Many rehabilitation counselors have reasoned that if more traditional and less costly methods of traveling are effective, then it is not necessary to encourage the use of expensive electronic travel aids. The counselors need to understand that the devices not only provide greater ease of movement, but also can be helpful on the job in situations in which equipment or people must be located. A final stumbling block to increased usage of electronic travel aids may be the attention that they draw upon the user. Some visually-impaired individuals have objected to the sounds made by a device or the appearance of the device. Many have not wanted to focus the attention on themselves that the device might cause. Manufacturers will need to take this into consideration as devices continue to evolve.

Solutions to some of these problems are currently being considered. At present, a controversy seems to be brewing concerning the amount of information that an electronic travel aid should provide the user. In one camp are the proponents of sophisticated environmental sensors that provide complex information whereas in another camp are those who would prefer a clear path indicator providing less complex information (Marsh, 1978). It would seem the best solution to the problem would be intelligent selection of such an aid. Those with the desire for more information and have the capability to process it should be helped to select a sophisticated aid while those requiring a less-complicated aid should be helped to select one that would be easier to use. The mobility specialist can best serve his student by helping him identify the most appropriate aid.

In the arena of funding the visually-impaired person and the mobility specialist will have to continue to pursue traditional funding sources and also be creative in finding new sources. One of the most interesting new approaches to funding the devices is the Mobility Foundation. The Foundation, located in North Wales, Pennsylvania, is a non-profit organization that attempts to provide electronic travel aids to visually-impaired people. It also provides insurance and maintenance costs. At present, the Foundation is primarily involved in funding laser canes but has the goal of establishing similar programs for the other devices. The Foundation provides part or all of the funds depending on the individual's financial resources and receives its funds from Service Clubs, charitable



trusts, foundations, and donations from corporations and individuals. The concept is laudable and may be the kind of solution that will place more electronic travel aids in the hands of users.

A further issue related to electronic travel aids is the question of how mobility specialists should receive their training. The majority of universities believe that electronic travel aid training should be offered as a postgraduate course after the instructor has had experience teaching traditional methods in the field. Using this as a model instructors in the field must seek training while employed. One approach used has been for the instructor to have released time from work to attend a short university training course. Another approach has been for manufacturers to run training programs sponsored by a university in the home area of the orientation and mobility specialists. A final alternative has been for a manufacturer to offer training independent of a university. The curriculum and standards might vary greatly depending on which of the above approaches are used. The profession will soon take steps toward insuring adequate training of instructors when they attempt to settle upon one or more approaches and establish certification of instructors who complete an acceptable program.

The electronic travel aids first developed as devices for the adult blind to use to supplement the cane or dog guide. It quickly became obvious however, that children could also benefit from their use. Specially-adapted equipment for children has been developed by some manufacturers and the devices have become useful for teaching children about space and their environment. It has been found that instruction with electronic travel aids may help the child in the areas of concept development, posture, spacial awareness, and low vision utilization (Scione 1978, Baird 1977, Newcomber 1977, Carter 1975). More than 20 schools in the United States have already begun developmental training programs with school-age children (TSI Bulletin, 1979). These devices hold much promise for child development.

### Orientation and mobility in public schools

Presently in most states, orientation and mobility specialists who want to teach within the public schools must obtain certification as classroom teachers for the visually handicapped. This requirement has the effect of preventing many qualified mobility specialists from obtaining employment in schools since most of the university programs preparing mobility specialists do not include preparation for employment as a classroom teacher. Furthermore, this situation at times forces school systems to consider hiring classroom teachers to provide mobility training, even though these teachers have not had preparation in orientation and mobility.

Some mobility specialists have sought certification as classroom teachers in order to obtain entrance into the public schools. This solution, however, has been inadequate because too few mobility specialists have been able to follow this route. Furthermore, the

course work necessary to become certified as a classroom teacher requires skills that are not taught by the mobility specialist. The mobility specialist, for example, does not teach braille and therefore, does not need comprehensive course work in this area. Also, the mobility specialist does not need preparation in classroom management, since almost all the instruction is handled on a one-to-one basis.

Concerned with these problems, Interest Group No. 9 of AAWB in 1976 appointed a committee to survey various states to determine methods used to obtain entrance into the public schools. In 1977 Michael Herron, chairman of the committee reported on its efforts. The ultimate goal of AAWB may be to develop a model proposal to aid mobility specialists in establishing a separate certification category for those who offer orientation and mobility training in public schools.

### Accreditation of universities

At present no formal system of accreditation exists for orientation and mobility training programs in universities. The field of orientation and mobility gives testimony to the adequacy of the educational preparation of the practitioner through the granting of certification to the individual practitioner. Those being awarded certification must have completed their academic training at a university that meets the standards of the field. Such determination is made by the certification committee of AAWB after evaluation of university curriculum and program content. At this point in time certification serves the dual purpose of evaluating both the institution of higher education and the individual applicant.

The standards by which the institution is judged are admittedly vague. The curriculum content of the university programs has gradually evolved from the 1960 Symposium on University Training and from suggestions within the COMSTAC Report. Both sources have given general guidelines, but do not provide a comprehensive statement. Faced with this dilemma, Interest Group No. 9 in 1977 appointed a Certification Review Committee to develop an accreditation proposal from one that had earlier been presented by this author to investigate the potential of establishing minimal standards for university programs. The new committee headed by Wiener formulated a comprehensive listing of essential curriculum and program standards for the July 1977 meeting of Interest Group No. 9 in Portland, Oregon. At that meeting it was decided that further review and development of the criteria were necessary (AAWB, No. 9 minutes). Continuation of this project by a committee headed by Cheryl Besdin has resulted in a revised document that lists competency-based components of instruction along with guidelines for curriculum and program for the universities. This concept will once again be evaluated at the 1979 AAWB Interest Group No. 9 meeting in Oklahoma City.



## Architectural and environmental barriers

Since the early 1960's, barriers affecting independent movement of the handicapped have been gaining more and more attention. In 1961, the American National Standards Association now called the American National Standards Institute, ANSI, published criteria for accessibility incorporating the following basic design features: a minimum of one ground-level entrance to a building, ramps available in at least one location, doorways at least 32 inches wide, facilities in restrooms that can accommodate wheelchairs, access to elevators, and safe parking for the disabled. A 1967 study conducted by the National Commission on Architectural Barriers came up with statistics that indicated only 3% of 278 cities and 4% of 124 counties had written building codes that took accessibility for the handicapped into consideration (Bowe, 1978). The ANSI Standards were reinforced with the passage of the Architectural Barriers Act of 1968 (P.L. 90-480) by requiring Federally-financed public buildings to be accessible to the disabled. Even with this legislation, however, the accessibility standards were not enforced because of loopholes in the law. Furthermore, the ANSI Standards focused upon the needs of the wheelchair bound and did not provide guidance for the visually impaired.

The Rehabilitation Act of 1973 (P.L. 93-112) with 1974 Amendments established the Architectural and Transportation Barrier Compliance Board with the responsibility of assuring accessibility. For years the Board has concentrated on the development of regulations and voluntary compliance. In 1977, however, the board issued regulations for implementation. Also in 1977, regulations were made that attempted to prevent discrimination against the handicapped. Sections 503 of the Rehabilitation Act requires accessibility by businesses, industry and other private establishments that receive contracts of over \$2,500 from the Federal government whereas Section 504 requires accessibility by recipients of Federal financial assistance such as colleges and universities. These requirements are for all disabilities including the visually handicapped and therefore motivation exists to develop architectural and environmental standards for the visually impaired.

Historically, the visually impaired have not put much emphasis on accessibility standards. This may be due in part to the well-developed network of orientation and mobility services that has emphasized coping with the environment rather than changing it. In 1975, however, the recognition of the importance of modifying the environment occurred when Interest Group No. 9 voted to establish a standing committee on Architectural and Environmental Concerns. The impetus for the committee stemmed from a presentation of various types of barriers by Kent Wardell at the 1975 AAWB Interest Group No. 9 meeting. Wardell was selected as Chairperson of the committee and with Helen Elias, Sandy Kronick, Robert Scheffel, and Phillip Giers produced a pamphlet with financial assistance from the Seeing Eye, Inc., for the purpose of outlining standards for eliminating



barriers to the visually impaired. According to the pamphlet, various hazards exist and should be changed.

The pamphlet explains that while wheelchair ramps are helpful to wheelchair users, they may be detrimental to the visually-impaired traveler unless they are standardized. Ramps should be made easily distinguishable by slope, a textural broom finish, outer groove edges, and small lip at the end of a ramp and possibly colored cement. Most important, the ramps should be in a consistent location so that the visually-impaired traveler will know where to expect them. Other standards include contrasting color schemes with adequate lighting for landmark or object identification. Consistency in these instances is important as in the cases of exits and emergency apparatus. A minimum height for signs of 7 feet from the bottom of the signs to the ground is necessary. Tree branches and vegetation should be trimmed so as not to overhang sidewalks. Scaffolding should not contain dangerous slant supports that can be struck by the head. Where stairway overhangs are present, they should be enclosed. Telephone side panels that project from the wall or post should be extended to the ground so that they may be contacted by the cane. Other objects such as drinking fountains and fire extinguishers should be recessed rather than projecting from the wall. Protruding hazards outdoors such as traffic-light control boxes, police telephones, fire-alarm boxes should be modified so contact can be made by the cane rather than the body (Wardell, 1977).

Further suggestions for interior and exterior standards have been outlined in the December 1977 issue of the Journal of Visual Impairment and Blindness. Suggestions in both that article and the Interest Group No. 9 pamphlet have laid a foundation but they can be viewed only as initial efforts. The years ahead will find more activity in generating appropriate standards.

#### Orientation and Mobility for other handicapped groups

Services to disabled populations have often focused on the disability rather than on the functional problems faced by the disabled. The blind, deaf, orthopedically handicapped, mentally retarded, and learning disabled have evolved separate services based on the category of disability. On examining the services it becomes obvious that many services generalize beyond the specific disability and could be applied equally to various disabled groups. The functional loss becomes the common denominator around which services can be developed for various groups. Orientation and mobility is an area of service that seems to cut across disabilities and could be most efficiently provided by function rather than disability.

Instruction in mobility, long available to the visually impaired, has not been so readily available in the community for other handicapped groups. The mobility services available to the visually impaired, however, generalize to other disabled groups.

Problem solving, communications, concept development and techniques of travel can be equally important to other groups as they are to the blind. The profession of orientation and mobility therefore offers a model of service that, if extended to other disabled groups, would help each individual reach his or her own level of independent functioning. Across the country in various areas orientation and mobility specialists are beginning to become involved in providing service to these groups. Furthermore, this past year a new orientation and mobility university training program began in Madison, Wisconsin with the intent of preparing mobility specialists for various handicapped groups including the blind. General orientation and mobility is a concept that may be a trend in the future.

### Research

A great many issues in orientation and mobility should be investigated experimentally. Some of these issues include the evaluation of various types of canes, orientation skills, and mobility skills. Our current knowledge of these matters emerges from clinical experience rather than experimental data.

One case in point is our current knowledge about canes. Initially, a wooden cane was used in the Valley Forge program. Later, the one piece cane was made from aluminum with conductive properties enabling it to transmit easily vibratory characteristics of the material being touched along the shaft. After some additional modifications, the Veterans Administration formalized specifications in 1964 and the National Research Council reaffirmed the standards in 1971. Alternative canes, both rigid and collapsible, have been developed but have not been widely accepted by the professional community because of the belief that the original aluminum cane is superior to anything else in conductive ability. Folding canes in particular have been degraded because it has been assumed that the various sections making up the cane break the transmission of the vibrations and prevent them from reaching the head of the user as readily as with a one-piece cane. Recently an evaluation of tactile and acoustic properties of various canes has been conducted (Berkowitz, 1979). The results of this study have indicated that there are canes made of various materials, both rigid and folding, that may be equally as good or even better than the one piece cane in conducting vibration. The present study is preliminary but raises many issues which are worthy of study. "What are the best materials out of which canes can be constructed?" "Can folding canes be as good or better than one piece canes?" "How do blind people make use of sensory information from the cane?" "What is the role of acoustic vs. vibratory information?" and "Are techniques that sample the ground by measuring resistance, such as touch and slide, superior to more traditional techniques?"

Research of a similar fashion on other topics would expand our understanding and help clarify issues that would help develop the knowledge base. Existing beliefs must be examined and either be

validated or repudiated. Orientation and mobility can continue to provide equality service only to the extent that it continues to evaluate itself and continues to develop new knowledge.

#### Note List

Note 1, Blasch, Donald. Presentation at Conference of Blind Rehabilitation University Faculty, 1979.

Note 2, Daily, Robert. Personal Communication, June 1979.

Note 3, Russell, Lindsey. Personal Communication, June 1979.

Note 4, Sharko, Judith. Personal Communication, June 1979.

Note 5, Daily, Robert. Personal Communication, June 1979.



## References

- Ad Hoc Committee on Mobility Instruction for the Blind, Report of the National Conference, Vocational Rehabilitation Administration, 1966.
- Baird, A. Electronic Aids: Can They Help Blind Children? Journal of Visual Impairment and Blindness, 1977 (March), pp. 97-101.
- Ball, Martha J. Mobility in Perspective. Blindness, 1964, pp. 107-141.
- Bentzen, B. Orientation Maps for Visually Impaired Persons. Journal of Visual Impairment and Blindness, 1977 (May), 193-196.
- Berkowitz, M. Research/Practice Seminar at American Foundation for the Blind, Moderator: Apple, L., Discussants: Mahler, M., Wiener, W., 1979 (April).
- Blasch, Donald. Orientation and Mobility Fans Out. Blindness. 1971, pp. 9-18.
- Blasch, B., and Apple, L. Workshop on Low Vision Mobility. Washington, D.C.: Veterans Administration, 1976.
- Blasch, B. and Welsh, R. Manpower Needs in Orientation and Mobility. The New Outlook for the Blind, 1974 (Dec.), pp. 433-443.
- Blasch B., Welsh, R., and Davidson, T. Auditory Maps: An Orientation Aid for Visually Handicapped Persons. New Outlook for the Blind, 1973 (April), pp. 145-148.
- Bowe, Frank. Handicapping America: Barriers to Disabled People. New York: Harper and Row Publishers, 1978.
- Carlson, A., Johnson, V., and Cavert, N. The Machinery of the Body. (5th ed.) Chicago: University of Chicago Press, 1961.
- Carter, Kent. The Sonic Guide and Distance Vision Training. Optometric Weekly, 1975 (September), pp. 21-26.
- Commission on Standards and Accreditation of Services for the Blind. The COMSTAC Report. New York The Commission on Standards and Accreditation of Services for the Blind, 1966.
- Cratty, B., and Sams, T. The Body-Image of Blind Children. Washington, D.C.: American Foundation for the Blind, 1968.
- Duncan, J., Gish, C., Mulholland, M. E., and Townsend, A., Environmental Modifications for the Visually Impaired: A Handbook.

- Journal of Visual Impairment and Blindness, 1977 (December), pp. 442-455.
- Evaluation of Sensory Aids for the Visually Handicapped. National Academy of Sciences (NAS), 1972.
- Festinger, Leon. A Theory of Cognitive Dissonance. New York: Harper and Row Publishers, 1957.
- Gibson, James. The Senses Considered as Perceptual Systems. Boston: Houghton Mifflin Co., 1966.
- Koestler, Frances. The Unseen Minority. New York: The David McKay Company, Inc., 1976.
- Malamazian, John. The First 15 Years at Hines. Blindness, 1970, pp. 59-77.
- Marsh, Peter. Sonic Aids for the Blind- Do They Work? New Beacon, 1978 (September), pp. 225-229.
- Miller, Josephine. Vision--A component of locomotion. Physiotherapy, (Chartered Society of Physiotherapists, Travistock Square, London), October, 1967.
- Mims, Forrest M. Sensory Aids for Blind Persons. The New Outlook for the Blind, 1973, pp. 407-414.
- Mobility and Orientation--A Symposium. The New Outlook for the Blind, 1960 (March), pp. 77-94.
- Newcomer, James. Sonic Guide: Its use with Public School Blind Children, Journal of Visual Impairment and Blindness, 1977 (June), pp. 268-271.
- Proceedings of the Rotterdam Mobility Research Conference. American Foundation for the Blind, 1965.
- Schlaegel, T. F. The Dominant Method of Imagery in the Blind as Compared to Sighted Adolescents. Journal of Genetic Psychology, 83 (1953), pp. 265-277.
- Scione, M. Electronic Sensory Aids in a Concept Development Program for Congenitally Blind Young Adults. Journal of Visual Impairment and Blindness, 1978 (March), pp. 88-93.
- Specially-Designed Sonic Guides Available--for Infants, Children. TSI ETA Bulletin, Number 1, 1978 (June), p. 2.
- Voorhess, Arthur. Professional Trends in Mobility Training. The New Outlook for the Blind, 1962 (Jan.), pp. 3-9.

- Wardell, Kent, Elias, H., Kronick, S., Scheffel, R., and Giers, P. Guidelines: Architectural and Environmental Concerns of the Visually Impaired Person. Interest Group IX, American Association of Workers for the Blind, 1977.
- Welsh, Richard. Cognitive and Psychosocial Aspects of Mobility Training. Blindness, 1972, pp. 99-110.
- Welsh, R., and Wiener, W. The Code of Ethics for Orientation and Mobility Specialists: A Progress Report. The Journal of Visual Impairment and Blindness, 1977 (May), pp. 222-224.
- Wiener, William. Audition for the Visually Impaired. To be published in Foundations of Orientation and Mobility, American Foundation for the Blind, 1979.
- Wiener, W., and Welsh, R. The Growth of the Profession of Orientation and Mobility. To be published in Foundations of Orientation and Mobility. American Foundation for the Blind, 1979.
- Wiener, W., Welsh, R., Hill, E., LaDuke, R., Mills, R., and Mundy, G. The Development of a Code of Ethics for Orientation and Mobility Specialists. Blindness, 1973, pp. 6-16.



# THE VISUALLY IMPAIRED DIABETIC AND THE IMPLICATIONS FOR ORIENTATION AND MOBILITY INSTRUCTION

by

Kent Tyler Wardell, Instructor  
Orientation and Mobility Program  
California State University at Los Angeles  
Los Angeles, California 90023

## Historical Perspective

Diabetes is not unique to modern man. It was described in ancient Egyptian medical texts and given detailed study by the Greek physician Arteaus who lived from 81-138 A.D. In fact, it was Arteaus who named diabetes. He believed that diabetes melted the flesh into urine and was caused by cold human climates.

Thomas Willis, a seventeenth-century English physician, laid the foundation for a distinction between two types of diabetes. One type became known as Diabetes Mellitus. The term "mellitus" comes from the Latin word for honey. Diabetes Mellitus is characterized by large amounts of sugar in the urine. The other type of diabetes is Diabetes Insipidus. This type of diabetes is characterized by excessive urination. However, large quantities of sugar are not present in the urine. It was not until the 20th Century that Diabetes Insipidus was traced to a malfunctioning of the pituitary gland thus causing the kidneys to pass excessive urine.

Hundreds of years of research on diabetes passed after the important work of Thomas Willis. Slowly a connection was established between Diabetes Mellitus and a gland located behind the stomach known as the pancreas. But, it was 1869 before a German medical student named Paul Langerhans discovered clusters of previously unknown cells in the pancreas. These clusters became known as "Islets of Langerhans." It was suspected that these cells produced a hormone that influenced the body's metabolism of carbohydrates. But what was this hormone? Why did Diabetes Mellitus result when the body's production of this hormone stopped?

The answers to these questions came in 1921 when Dr. Frederick G. Banting and his medical student Charles Best isolated this hormone and named it insulin. They gained world attention by demonstrating

the benefits of insulin injections in severe cases of Diabetes Mellitus. Their efforts resulted in a Nobel Prize in Physiology and Medicine in 1923.

### Diabetes--The Scope of the Problem

Diabetes is a health problem of major proportions and the facts concerning its incidence are staggering. The fact sheet of the American Diabetes Association estimates that 10 million Americans are directly affected and the numbers are increasing at a rate of six percent per year. The fact sheet goes on to state:

#### Who is most likely to get diabetes?

Anyone may become diabetic, but it is more common in certain groups of people than in others:

People who are overweight. The chance of developing diabetes doubles with every 20% of excess weight.

People with diabetic relatives. Diabetes runs in families, though it may skip a generation or more.

People over 40. Children and young adults do develop the disease, but most of all it is a disease of middle and old age.

Women may be more likely than men to have diabetes.

#### What are the symptoms of diabetes?

Frequent urination accompanied by unusual thirst and excessive drinking of fluids.

Weight loss with easy tiring, weakness, irritability or nausea.

Frequent desire to eat.

Frequent infections of the skin, gums, or urinary systems.

Intense itching.

Pain or cramps in legs, feet, fingers.

Slow healing of cuts and bruises.

Unusual changes in/or blurred vision.

Drowsiness.

Any one of these signals may indicate the presence of diabetes.

Proper control of diet, types of insulin, administration of insulin injections, regulation of insulin dosage, and urine testing go beyond the scope of this paper. These items should be dealt with in the cooperative effort between the physician and his patient.

### Normal Body Action in the Use of Food

To understand diabetes one must first understand the normal body action in the use of food. In simplest terms, the body can be thought of as a machine that needs fuel to operate properly. Most people think that food is the body's fuel. Indirectly this is true, but the process is more complicated. The food one eats is the raw material from which the body processes and extracts its needed fuel. The digestive system helps break the carbohydrates, fats, and proteins in food into simpler materials. Sugars and starches are part of the family of carbohydrates and they pass into the bloodstream as glucose. Glucose is an important fuel needed by the body. In brief, five major steps are involved:

1. Food arrives in the stomach and, through digestion a portion is transformed into glucose (commonly called sugar).
2. The glucose enters the intestine and bloodstream. Keep in mind, this entry does not in itself produce energy. It must move from the bloodstream into the body tissues where its energy is released.
3. The presence of glucose in the intestines and bloodstream helps activate the pancreas to produce insulin and release it into the bloodstream.
4. Insulin is an important catalyst in oxidizing glucose. The process is not fully understood, but it is believed that insulin acts upon the cell wall promoting the passage of glucose into the body cells.
5. Insulin also helps in the process of storing some of the glucose in the liver and helps regulate the amount of glucose carried by the bloodstream to the body's tissue cells.

### Diabetes Mellitus--Abnormal Body Action in the Use of Food

We have seen the importance of the pancreas in the production of insulin and the importance of insulin in the body's use and storage of glucose. Interruption in the body's supply of insulin causes abnormal body action in the use of food. The following seven steps trace this cycle of events:



1. Food arrives in the stomach and through digestion a portion is transformed into glucose.
2. The glucose enters the bloodstream.
3. The presence of glucose in the intestines and bloodstream fails to activate the pancreas into producing and/or releasing effective insulin.
4. Without the presence of insulin, most of the glucose is prevented from entering the body cells, and/or from being stored in the liver.
5. The large amount of glucose that normally enters the liver is now forced to continue circulating within the bloodstream.
6. Eventually the body expels this glucose through the urine.
7. The important result of this process is that the body lost its valuable supply of energy-producing glucose.

The body must have energy to function. It is in a state of emergency when it has no glucose to draw from storage in the liver. In essence it is starving for fuel. The body must now depend on alternate sources of energy. One of these is the body's own fatty acids. These are broken down through oxidation and some of the energy needed is released.

It would seem that the body's problems have been solved. However, a dangerous byproduct has been produced. The oxidation of the fatty acids gives off a toxic waste product known as ketones. These ketones result in a major increase of acids contained in the blood. In effect, the body has poisoned itself in an effort to obtain fuel. This condition is known as ketoacidosis. The end result can be coma and possibly death.

#### Adverse Effects on the Eye

Thus far we have concentrated on the adverse effect of Diabetes Mellitus on the metabolism of carbohydrates and fat. Unfortunately there is another adverse effect. Diabetes Mellitus is also characterized by disorders in the function and structure of the body's blood vessels. These vascular abnormalities frequently cause lesions in the retina of the eye and lesions in the kidneys. Vascular complications of diabetes related to the eye are called retinopathy; complications related to the kidneys are called nephropathy; and complications related to the nervous system are called neuropathy.

Many people mistakenly believe that the severity of the retinopathy is directly proportional to the amount of insulin taken

per day. This is not true. In fact not all diabetics enter into a condition of diabetic retinopathy. However, the chances of developing retinopathy increase with the number of years the patient has a diabetic condition. This is indicated in the following statement by Patz.

At the present time the basic cause of diabetic retinopathy is unknown. The duration of diabetes is the only factor that has been documented to be related to retinopathy. The incidence and severity of retinopathy is generally proportional to the duration of the disease: e.g. in patients with diabetes for ten years, approximately 50 percent show some degree of retinopathy; after 15 years 75 percent show some degree of retinopathy; and after 25 years, approximately 95 percent have some degree of retinopathy. There are exceptions, however, and patients occasionally will develop retinopathy at the onset of their diabetes.<sup>1</sup>

The retina is rich with blood vessels. The smaller vessels are called capillaries. Problems develop because Diabetes Mellitus weakens the structure of these capillaries. Small bulb-like forms puff out at the weak spots in the capillary wall. These puffs are called aneurysms or microaneurysms. This is somewhat analogous to water under high pressure running through an old garden hose. An "aneurysm" of sorts, may puff out of the weakened side wall if the nozzle is closed but the water at the spigot is kept on at full force. The weakened wall of the hose may eventually rupture permitting the water to flow out.

Similarly, the aneurysms in the weak wall of the capillaries may also rupture. The extent of this rupture is important. Less damage may be done if the leaking of blood and protein material is confined to the retina. This type of hemorrhage is called intraretinal because it is confined within the retinal layer of the eye. It is also called non-proliferative retinopathy because the vessels did not break through the retinal layer and hemorrhage into the vitreous fluid. Small hemorrhages confined to the retina may go unnoticed by the diabetic. They may not cause noticeable changes in vision unless they occur in the macular area.

Another type of problem is called proliferative retinopathy. New vessels with weakened side walls grow into the vitreous. If a hemorrhage occurs, the blood and protein material leaks into the vitreous. The normally clear vitreous becomes clouded and overall vision becomes impaired.

Various medical procedures may be attempted to assist the patient with diabetic retinopathy. Xenon light or argon laser light

---

<sup>1</sup>Patz, M.D., Arnall, "Diabetic Blindness," Blindness: 1969 AAWB Annual, American Association of Workers for the Blind, 1511 K St., N.W., Washington, D.C. 20005, 1969, p. 29.

may be used to cauterize the capillaries and prevent hemorrhaging. A vitrectomy is an option in some cases. It is a process used to replace vitreous fluid that has been clouded from hemorrhages. In this process a suction instrument replaces the clouded vitreous with a clear solution. Many additional procedures are used in cases of diabetic retinopathy.

Unfortunately other visual problems may develop in addition to the retinopathy. This is particularly true in prolonged cases of diabetes. Cataracts and glaucoma are not uncommon complications.

### The Role of Orientation and Mobility Specialists

If indeed, the visually impaired client is also diabetic, the task of the orientation and mobility specialist takes on new dimensions. It is necessary for the specialist to work with the client, his/her doctors, and the family to develop a well-documented case history. In addition to the usual information obtained, particular attention should be paid to the following points:

1. Learn the type and amount of oral medication or insulin taken daily.
2. Investigate what additional physical problems may be present.
3. Find out what types and amounts of medication are taken for these additional problems.
4. Determine the name, address, and phone numbers of all medical personnel involved in the case.
5. Make a note of all emergency numbers for family members and medical personnel and carry this information with you on daily lessons.
6. Carefully explain the orientation and mobility course of instruction to the student, family, and medical personnel. Determine if this increase in physical activity will require the doctor to make changes in the dosage of medications.
7. Ascertain if the diabetes is under control or do frequent reactions occur. Learn when these reactions are most likely to occur.
8. Find out if the student can tell when a reaction is developing and what symptoms warn him.
9. Determine if the student regularly carries sugar substances to use when a reaction is imminent



10. Find out if the student wears Med-Alert tags.

### Understanding and Recognizing an Insulin Reaction

An insulin reaction is also called insulin shock, hypoglycemia, or just plain shock. It results when there is a lowering of the glucose level in the body. This can happen for a number of reasons, but one can be the increased physical activity brought about by orientation and mobility training. The additional exercise increases the expenditure of energy (glucose) leaving a surplus of insulin in the body. A low glucose level may frequently be caused by skipping a meal or postponing it until after the orientation and mobility lesson. Another cause for a low glucose level might be an error in filling the insulin syringe. This could result in too much insulin being injected into the body.

The symptoms of an insulin reaction differ from person to person. However the student may be able to tell the ones that are typical for him/her. Some of the more common symptoms are these:

- a. Loss of coordination resulting in a swaying, staggering gait reminiscent of intoxication.
- b. Wet skin with the forming of beads of perspiration on the forehead, hands and arms.
- c. Perspiration accompanied by pale skin color instead of the flushed color one might expect with perspiration.
- d. Slurred speech. This inability to speak clearly is again reminiscent of a state of intoxication.
- e. Rapid shallow breathing.
- f. Headache.
- g. Excessive hunger.
- h. Sudden onset of symptoms.
- i. Inability to think clearly, disorientation to time and place.
- j. Nausea.
- k. Numbness or tingling sensations.
- l. Inappropriate actions or responses.
- m. Mood changes with the client becoming irritable, angry and/or uncooperative.
- n. State of unconsciousness.

## Coping with an Insulin Reaction

The proper procedure for dealing with an insulin reaction is to get sugar into the client's body quickly. It is strongly recommended that the orientation and mobility specialist carry a product like Instant Glucose. It is advertised by the Diabetes Association of Greater Cleveland as follows:

Instant Glucose is a pure food product used for the treatment of insulin reactions. It is packaged in tubes and contains 25 grams of glucose with cherry flavoring. It may be utilized by placing the solution in the cheek or under the tongue. This product requires no refrigeration and will keep indefinitely.

The cost of this product is \$4.00 for three tubes and may be ordered from the Diabetes Association of Greater Cleveland, 2022 Lee Road, Cleveland, Ohio 44118. Another similar product is called "Reactose" that is sold by the American Foundation for the Blind, 15 West 16th St., New York, N.Y. 10011. This pocket-size plastic vial contains about three doses. Its order number is ME-593 and it costs \$2.25. If such products are not available, two packets of sugar, two teaspoons of sugar, or multiple sugar cubes can be used. Fruit juice is distributed quickly into the body and can be used for its sugar content. Other alternatives are candy bars, carbonated beverages containing sugar, or Life Savers.

## Understanding and Recognizing Diabetic Acidosis

The condition of diabetic acidosis is also called diabetic coma, ketosis, and ketoacidosis. It results when there is too little insulin in the body, causing the glucose level to reach a high concentration. This may occur for a number of reasons. The client may simply neglect to take the insulin injections. Or, perhaps he/she repeatedly fills the syringe with too little insulin. It is also possible for stress to upset the insulin-glucose balance. This could happen when the student is about to enter difficult lessons in the training sequence like street crossings or drop-off lessons.

The symptoms of acidosis differ from person to person and the student should be consulted about symptoms common to his or her condition. Some of the more common symptoms are:

- a. Strong acid breath.
- b. Cold dry skin but a flushed skin color.

- c. Persistent thirst and increased urination; remember that the body is actually in a state of dehydration in an attempt to flush out the accumulation of body acids.
- d. Labored deep breathing.
- e. Drowsiness or lethargic movements.
- f. Rapid pulse.
- g. Vomiting or abdominal pain.
- h. Unconsciousness.

### Coping with Diabetic Acidosis

The proper procedure for dealing with an acidosis condition is to get the client to a doctor or hospital as quickly as possible. A dangerous diabetic coma can result if symptoms are neglected over a prolonged period of time. This is usually 24-48 hours. Many instructors voice apprehension about recognizing acidosis.

The important question becomes, "If I am not sure if the condition is acidosis or insulin reaction, what should I do?" The answer is to administer glucose. If you are mistaken and the student has an acidosis condition, the additional glucose will have no major adverse effect on the person's health. His symptoms will continue since the glucose does not cause an improvement in his/her condition. When this is noted, the client should be taken to where professional medical attention is available.

Conversely, serious damage can be done if glucose is not administered and the client's condition is actually insulin reaction. The lack of glucose and the extra time expended in getting the client to the hospital could have major adverse effects. Again it should be noted--if not sure, administer glucose and closely monitor the client's response.

### Proper Foot Care

Proper foot care is extremely important for the visually-impaired diabetic since the neuropathy of his/her condition may diminish the feeling in the feet. Therefore the pain of poorly-fitting shoes, incorrectly cut toenails, blisters, corns and cuts may go unnoticed. Infection may develop and it is not uncommon for the person to lose toes or even for the entire foot to become gangrenous. The client must appreciate the importance of good foot care and the orientation and mobility specialist must maintain this atmosphere of caution. It is in the client's best interest to wear



good quality socks that do not have seams under the toes or heels. These seams can rub blisters. This also rules out socks that have lumpy areas due to darning repairs. The socks should also have the capacity to absorb foot moisture and the use of a foot powder is most desirable. Also, the socks should not have a tight elastic top since this may further impair circulation to the feet.

Proper choice of shoes is also important. Leather shoes are best since manmade materials hinder proper air ventilation to the feet. Sandals are never appropriate because of the obvious danger of blisters and abrasions from the straps of the sandals. Properly-fitting shoes are of course important. The shoes should be "broken in" slowly. Thirty to sixty minutes of leisure-wearing per day around the house will get the job completed safely over several weeks time.

Clients sometimes make the mistake of purchasing new shoes to begin training at the rehabilitation center. They may refer to entering training as going back to school, and of course this means purchasing new clothes for the first day of classes. These purchases may include new shoes that are dangerously slippery on the stairs. The intake interview should encourage the client to begin training with comfortable shoes that are well broken in.

The walking involved in orientation and mobility training is usually extensive. Despite the fact that instructors and clients exercise proper precautions, bumps and bruises occasionally do occur. These occurrences should be reported to the proper medical staff attached to the school or rehabilitation facility and also to the client's personal physician. The instructor should make sure that the bruise has received the necessary attention to prevent infection.

Proper safeguards must also be taken during winter lessons. The client's feet should be properly insulated from the cold. Frostbite occurs more easily to the diabetic because of the poor circulation and the lack of sensitivity in the extremities. But, caution must be taken against multiple pairs of socks and heavy boots rubbing blisters. Warming the feet after the lesson should also be done cautiously. Clients have been known to burn their feet in hot water, against heating registers, and heating pads. The feet should be warmed in blankets.

Proper foot care extends beyond the proper type of shoes and socks. Caution is needed in cutting toenails. It is desirable for the blind diabetic to have sighted family members or sighted friends cut the toenails and inspect the feet regularly for signs of abrasions, blisters or infections. Removal of corns and calluses should be left to the podiatrist.

## Reduction of Tactual Sensitivity

The neuropathy may result in some lack of tactual sensitivity in the fingers as well as the feet. This may cause the visually-impaired diabetic client to have reduced effectiveness using tactual maps and braille symbols. However, some students are able to function adequately using large dot braille. The neuropathy may also result in some loss of tactual information transmitted through the long cane. This can be offset somewhat by encouraging a light touch with the cane and increasing the use of touch and slide technique.

## Curb Location and Reaction Time

Curb location and reaction time may also present problems. The blind diabetic will require greater proficiency in the use of time-distance estimation and environmental clues to determine the end of the block. Parallel and perpendicular auditory clues of traffic and/or footsteps should also be stressed. It should be remembered that slopes near the curb or a wheelchair ramp at the corner may not be felt underfoot.

However, the student can be taught to recognize his quickened walking pace brought on by the downhill slope. The cane may also be lengthened beyond normal limits to foster increased reaction time. In familiar neighborhoods, increased reliance on time distance estimation and landmarks near the end of the block can be learned.

## Functional Vision May Fluctuate

Some students have good functional vision and the Orientation and Mobility training stresses the safe and efficient use of this vision. However, they may be subject to recurring periods of hemorrhage and the clouding of vision. If they are fortunate, there may be eventual clearing of vision. But, this cycle may take days or months. This type of student must be taught from two perspectives. He must learn to use his vision when it is clear. The basic skills (precane), cane techniques, auditory skills and tactual skills are used to supplement this functional vision. They are used in those travel situations in which vision does not function safely or efficiently. He must gain the flexibility to switch from a predominantly visual traveler to a predominantly non-visual traveler in those times of severe visual clouding. For example, on days of good vision he may cross busy streets by visually tracking the flow of traffic. He visually determines the traffic surge and crosses safely. He may use his cane as a warning to drivers that he has a visual impairment. However, on other days, the visual fluctuation

may force him to cross this busy street by auditorily determining the flow of traffic. Thus, he must depend on his auditory skills to indicate when to leave the curb with the surge of parallel traffic. His cane is used to clear the area before stepping off the curb, to locate objects in the crosswalk, to locate the curb after crossing, and to clear the area above the curb before stepping up. The long hours of training will pay by providing the flexibility for independent movement in times of minimal functional vision.

#### Reduction of Patellar Reflex Tendon

Some students experience difficulty negotiating stairs and curbs. Diabetes Mellitus may affect the patellar reflex tendon causing this difficulty. The student can be taught to use the handrails on stairs more extensively for the extra support. The student may be helped in stepping up on curbs by suggesting he/she place the entire foot (heel to toe) up on the curb before stepping up. In other words, don't attempt to step up with just the toes on the curb and the heel extending over the curb. This puts too much stress on the foot and leg when the body weight is transferred forward. The foot may slide back off the curb causing a fall.

#### Summary

In brief, the visually-impaired diabetic can be aided by the usual facets of orientation and mobility training with adaptations of certain facets to accommodate the diabetic condition. Obviously, certain additional precautions need to be considered and some of these are outlined in the preceding sections. The chart that follows summarizes some of the more cogent points that have been covered.



TOO LITTLE INSULIN--  
TOO MUCH GLUCOSE

Body Imbalance is Called:

Diabetic Coma  
Diabetic Ketoacidosis  
Acidosis  
Ketosis

Caused by:

Forgetting to take insulin  
Amt. of insulin taken is too  
    small  
Increased amounts of stress  
Infection or respiratory problem

Some of the Possible Symptoms:

Thirst  
Cold  
Flushed face  
Dry skin  
Acid breath  
Drowsiness or lethargic attitude  
Rapid pulse  
Abdominal pain  
Vomiting  
Headache  
Labored deep breathing

Result on the Body:

Sugar (glucose) reaches above  
    normal concentration in the  
    blood

Treatment:

Needs doctor's attention

Onset of the Condition:

Usually slow over a period of  
    days

Response to Treatment:

Slow

TOO MUCH INSULIN--  
TOO LITTLE GLUCOSE

Body Imbalance is Called:

Insulin Shock  
Insulin Reaction  
Shock  
Hypoglycemia

Caused by:

Too high dosage of insulin or  
    oral compounds  
Delayed meals  
Increased physical exercise  
Decreased food intake

Some of the Possible Symptoms:

Sweating  
Pale skin  
Lack of coordination  
Inability to speak and think  
    clearly  
Headache  
Nervousness  
Strong hunger  
Rapid shallow breathing  
Weakness or faint feeling  
Trembling  
Heaviness of arms and or legs  
Abnormal/unusual behavior  
Mood changes

Results on the Body:

Lowering of the glucose level in  
    the blood

Treatment:

Sugar or instant glucose that  
    raises the blood sugar rapidly

Onset of the Condition:

Fast

Response to Treatment:

Fast

## Bibliography

- American Diabetes Association. Diabetes Forecast.
- American Diabetes Association. Diabetes Mellitus, 4th ed. New York: Author, 1978.
- American Diabetes Association. Rights and opportunities for the diabetic under the Rehabilitation Act of 1973. New York: Author.
- American Diabetes Association. What you need to know about diabetes. New York: 1978.
- American Diabetes Association. Southern California Affiliate, Inc. Fact Sheet. Los Angeles: American Diabetes Association. So. Calif. Aff., Inc.
- American Foundation for the Blind. Blindness and Diabetes. (Text by Dava Grayson). New York: American Foundation for the Blind, 1975.
- Basso, Lawrence V., M.D. The Condition known as Diabetes Mellitus. The Journal of Visual Impairment and Blindness, 1978, 72, 338-342.
- Berkow, J. W. Patz, A., & Fine, S. A follow-up of blind diabetic patients. Annals of Ophthalmology, 1975, 7, (1) 79-82.
- Berkow, J. W. et al. A retrospective study of blind diabetic patients. Journal of the American Medical Society, 1965, 193, (11) 867-870.
- Bierman, June and Barbara Tochey. The Diabetes Question and Answers Back. Los Angeles, California: Sherborne Press, Inc., 1974.
- Bierman, June and Barbara Tochey and Margaret Bennett. The Peripatetic Diabetic. New York: Hawthorne Books, 1969.
- Boyles, F. A. Independence for the visually impaired insulin-taking diabetic. Rehabilitation Teacher. 1975, 7, (6) 1-7.
- Caulfield, T. E. Is there such a thing as a blind diabetic personality? In AAWB Contemporary Papers Vol. V (Diabetes and Blindness: Implications for Rehabilitation Services). Washington, D.C.: American Association of Workers for the Blind, 1969.
- Cohen, Ephraim B., M.D. and Donnell Etzwiler, M.D. Diabetes Manual Fifth Edition. Diabetes Education Center, 4959 Excelsior Blvd.,

Minneapolis, Minnesota, 55416. Health Education for Living Program, Inc., 1976.

- Coughlin, Ronald W., M.D. Diabetic retinopathy--nature and extent. The Journal of Visual Impairment and Blindness. 1978, 72, 343-347.
- Cull, John G., Ph.D., and Richard E. Hardy, Ed. D. Counseling and Rehabilitating the Diabetic. Springfield, Ill.: Charles C. Thomas, 1974.
- Danowski, T.S., M.D. Diabetes as a Way of Life. New York: Coward-McMann & Geoghegan, Inc., 1974.
- Dolger, Henry, M.D., and Bernard Seeman. How to Live with Diabetes. New York: W.W. Norton & Company and Pyramid Books, 1972.
- Donahue, Virginia M. Diabetic Cooking Made Easy. Minneapolis, Minnesota: Burgess Publishing Co., 1973.
- Duncan, Theodore G., M.D. The Good Life with Diabetes. Philadelphia, Penn.: The Garfield G. Duncan Research Foundation, 1973.
- Eli Lilly and Company. A Guide for the Diabetic. Indianapolis, Indiana: Eli Lilly and Company, 1975.
- Eli Lilly Research Laboratories. Diabetes Mellitus. Indianapolis, Indiana: Eli Lilly Research Laboratories, 1967.
- Fine, S. L. Some plain talk on diabetic retinopathy. The Sight Saving Review, 1967, 46 (1), 3-9.
- Fisher, Alfred E., M.D., and Hosstmann, Dorothea L. A Handbook for the Young Diabetic. New York: Stratton Foundation, Inc., 1972.
- Freedman, S. Educational and Vocational Aspects of the Blind Diabetic. In AAWB Contemporary Papers, Vol. V (Diabetes and Blindness: Implications for Rehabilitation Services). Washington, D.C.: American Association of Workers for the Blind, 1969.
- Jackson, H. Helping a blind diabetic patient become self-dependent. American Journal of Nursing, 1962, 62.
- Laufer, Ira, M.D., and Kaddison, Herbert. Diabetes Explained: A Layman's Guide. New York: E. P. Dutton & Co., Inc., 1976.
- Lee, P., et al. A new classification of diabetic retinopathy, American Journal of Ophthalmology, 1966, 62 (2), 207-219.
- Lessin, S., and Prunty, K. A. Teaching the blind diabetic self-administration of insulin. Public Health Nursing, 1947, 39 (12) 622-624.



- Little, Billie, and Thorup, Penny L. Recipes for Diabetics. New York: Bantam Books, 1972.
- Lowenstein, Bertrand E., M.D., and Paul D. Preger, Jr. Diabetes--New Look at an Old Problem. New York: Harper & Row Publishers, 1976.
- Maugh, T. H. Diabetic retinopathy: New ways to prevent blindness. Science, 1976, 192, 539-540.
- Maurawski, B. J., Chazan, B. I., Balodimos, M. D., and Ryan, J. R. Personality patterns in patients with diabetes mellitus of long duration. Diabetes, 1970, 19, 259-263.
- Milton, W. E. Canadian experience with training and employment services for blind diabetics. In AAWB Contemporary Papers, Vol. V (Diabetes and Blindness: Implications for Rehabilitation Services). Washington, D.C.: American Association of Workers for the Blind, 1969.
- Muldoon, John F., Ph.D., M.P.H. The diabetic's guide to the health care system. Journal of Visual Impairment and Blindness. 1978, 72, 348-353.
- Oehler-Giarratona, J. Personal and professional reactions to blindness from diabetic retinopathy. New Outlook for the Blind, 1976, 70, (6).
- Patz, A. The challenge of diabetes as a cause of blindness in the 1970's in Blindness 1973 (Annual of the American Association of Workers for the Blind). Washington, D.C.: American Association of Workers for the Blind, 1973.
- Richetts, E. The blind diabetic in a rehabilitation setting. In AAWB Contemporary Papers, Vol. V (Diabetes and Blindness: Implications for Rehabilitation Services). Washington, D.C.: American Association of Workers for the Blind, 1969.
- Rogers, F. L., and Leverton, R. M. Your Diabetes and How to Live with It, Ed. 2. Lincoln: University of Nebraska Press, 1961.
- Rosenthal, H., and Rosenthal, J. Diabetic Care in Pictures, Ed. 4. Philadelphia: J. B. Lippincott Company, 1968.
- Safir, A. Ophthalmological aspects of blindness due to diabetes. In AAWB Contemporary Papers, Vol. V (Diabetes and Blindness: Implications for Rehabilitation Services). Washington, D.C.: American Association of Workers for the Blind, 1969.
- Schmitt, G. F. Diabetes for Diabetics, Ed. 3. Miami: Diabetes Press of America, 1971.

Schultz, Joyce M., R.N., and Williams, Marie, B.A., M.S.W.  
Encouragement Breeds Independence in the Blind Diabetic.  
Nursing 76, 1976, December, 19, 20.

Sindoni, A. M. The Diabetic's Handbook, Ed. 2. New York: The  
Ronald Press Company, 1959.

Weller, C., and Boylan, B. R. The New Way to Live with Diabetes.  
Garden City: Doubleday and Company, Inc., 1966.

Williams, Marie S., ACSW. Programs for blind diabetic clients at a  
rehabilitation center. The New Outlook for the Blind, 1975,  
69, 402, 406.









1195

154

AAWB ANNUAL 1979-80

Blindness. American Association of  
Workers for the Blind

PROFESSIONAL LIBRARY  
AMERICAN PRINTING HOUSE FOR THE BLIND  
LOUISVILLE, KENTUCKY



AMERICAN ASSOCIATION OF  
WORKERS FOR THE BLIND, INC.

1511 K STREET, N. W.  
WASHINGTON, D. C. 20005

NON-PROFIT ORG.  
U.S. POSTAGE PAID  
WASHINGTON, D. C.  
PERMIT NO. 42036